This Week in The Iron Age

MAY 30, 1940

VOL. 145 NO. 22

Editorial

Horse Swapping 15

Technical Articles

Case Carburization of Steel 17
Double Boiler for Melting Zinc 23
What's New 24
Pickling and Polishing of Metals II 26
Cooling System for Quenching Oils 31
Progress Rides the Coattails of Obsolescence 32
What's New in Motors and Controllers 36

Feature Reports

On the Assembly Line 42
This Week in Washington 46

News and Market Reports

News of Industry	50	The Industrial Pace	80
Iron and Steel Institute Meets	58	District Market Reports	82
Gear Association	62	Machine Tool Activity	86
National Metal Trades	66	Non-Ferrous Metal Market	87
Warehouse Convention	68	Scrap Market and Prices	88
Exports and Imports	73	Construction Steel	90
Personals and Obituaries	74	Iron and Steel Prices	92
Metal Working Activity	77	Pig Iron, Ferroalloys Prices	93
Comparison of Prices	78	Warehouse Prices	98
Summary of the Week	79	Sales Possibilities	100

Free Industrial Literature 51
Products Advertised 107
Just Between Us Two 109
Index to Advertisers 132

Copyright, 1940, by Chilton Company (Inc.)

J. H. VAN DEVENTER
President and Editor

C. S. BAUR
Vice-President and General Manager

C. E. WRIGHT, Managing Editor — J. A. ROWAN, News Editor — T. W. LIPPERT, Technical Editor
R. E. MILLER, Machinery Editor — F. J. WINTERS, Art Editor — A. I. FINDLEY, Editor Emeritus

Associate Editors
F. J. OLIVER — W. A. PHAIR — G. RICCIARDI

Washington Editors
L. W. MOFFETT — JAMES G. ELLIS

Resident District Editors
T. C. CAMPBELL, Pittsburgh — ROBERT G. BINGHAM, Chicago
D. R. JAMES, Cleveland — W. F. SHERMAN, Detroit

Editorial Correspondents
F. T. TURNER, JR., Buffalo — ROBERT G. McINTOSH, Cincinnati
G. FRAZAR, Boston — CHARLES POST, San Francisco
HUGH SHARP, Milwaukee — CLYDE W. ENNIS, Birmingham
F. SANDERSON, Toronto, Ontario — ROY M. EDMONDS, St. Louis
LEROY W. ALLISON, Newark, N. J.

A. H. DIX, Manager Reader Service

Advertising Staff

Emerson Findley, Robert F. Blair } 621 Union Bldg., Cleveland
B. L. Herman, Chilton Bldg., Philadelphia
H. K. Hottenstein, 1012 Otis Bldg., Chicago
H. E. Leonard, 239 W. 39th St., New York
Peirce Lewis, 7310 Woodward Ave., Detroit
C. H. Ober, 239 W. 39th St., New York
W. B. Robinson, W. J. Fitzgerald } 428 Park Bldg., Pittsburgh
D. C. Warren, P. O. Box 81, Hartford, Conn.
Don F. Harner, 1595 Pacific Avenue, Long Beach, Cal.

Member, Audit Bureau of Circulations
Member, Associated Business Papers
Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 a year. Single copy, 25 cents. Annual Number $1.00. Cable Address, "Ironage, N. Y."

Owned and Published by
CHILTON COMPANY
(Incorporated)

Publication Office
Chestnut and 56th Sts., Philadelphia, Pa., U.S.A.

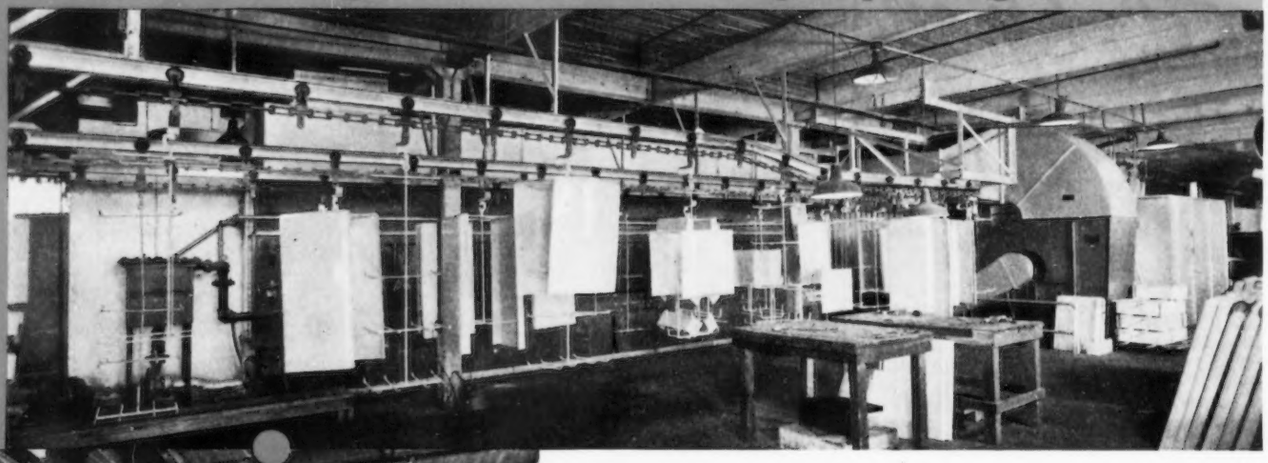
Editorial and Executive Offices
239 West 39th St., New York, N. Y., U.S.A.

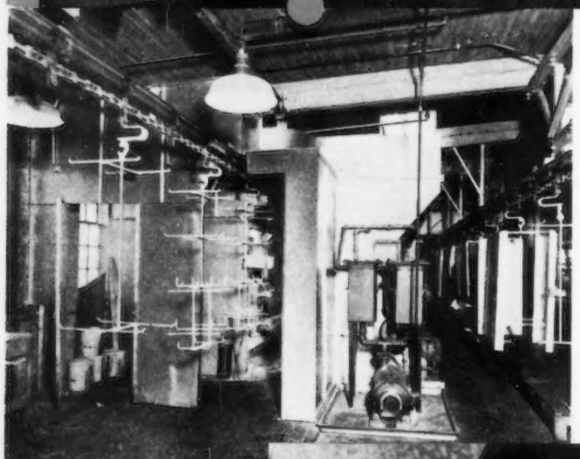
OFFICERS AND DIRECTORS

C. A. MUSSELMAN, President
JOS. S. HILDRETH, Vice-President
GEORGE H. GRIFFITHS, Vice-President
EVERIT B. TERHUNE, Vice-President
J. H. VAN DEVENTER, Vice-President
C. S. BAUR, Vice-President
WILLIAM A. BARBER, Treasurer
JOHN BLAIR MOFFETT, Secretary
JULIAN CHASE, THOMAS L. KANE, G. C. BUZBY, P. M. FAHRENDORF, HARRY V. DUFFY, CHARLES J. HEALE

Industrial FINISHING EQUIPMENT...

Complete Systems Thoroughly Engineered





The top illustration shows one of two complete units designed and installed by Mahon for the Gibson Refrigerator Company, Greenville, Michigan. The illustrations above show the entrance to a Mahon Down-Draught Hydro-Filter Spray Booth—part of the same installation. This Finishing System was designed for the application of Synthetic Enamel and has been in operation for approximately two years.

Above: Interior of a Mahon Down-Draught Hydro-Filter Spray Booth showing filtered air supply.

...to Meet YOUR Exacting Requirements

Production finishing today has reached a point where proper equipment becomes more and more essential—particularly in industries where product finish is a vital sales factor. That is why so many manufacturers are now turning to Mahon for complete new finishing systems . . . they know that a finishing system must be thoroughly engineered to do a specific job, and that it must be properly balanced and coordinated to operate efficiently and economically. Mahon engineers have designed and installed hundreds of finishing systems in industries where finishing constitutes a major production operation . . . through constant research and development, in this highly specialized field, they have successfully solved many complex finishing problems—their practical experience, and their thorough knowledge of modern finishing methods, fits them to produce a better planned, better engineered finishing system for your plant . . . a finishing system that will show you greater savings and be more economical to operate over a period of time. If you are contemplating a new finishing system, or any unit thereof, call in a Mahon engineer now—consultation will not place you under any obligation. Write today.

THE R. C. MAHON COMPANY
DETROIT — — CHICAGO

Designers and Manufacturers of Complete Finishing Systems, Metal Cleaning Machines, Rust Proofing Machines, Hydro-Filter Spray Booths, Ovens of All Types, Filtered Air Supply Units, Hydro-Foam Dust Collectors and many other Units of Special Production Equipment.

MAHON

The Iron Age

MAY 30, 1940

ESTABLISHED
1855

Horse Swapping . . .

IN these days of apprehension and confusion, first thoughts are not usually best thoughts. That has been pathetically demonstrated by recent events in England and in France.

England, faced with a succession of diplomatic and military failures, found at long last that the umbrella was not as potent as the sword. So England decided to swap horses in midstream.

France, faced with a succession of military defeats and admitting a lack of adequate preparation, also found it necessary to swap horses in midstream.

Maybe this horse swapping on the part of England and France has been too late and maybe not. History will answer this question. But at least it is clearly evident that there is nothing to be gained by sticking to a sway-backed and spavined nag when the time comes to go places.

If we make a success of our defense program, it will be because capital and labor pull together as a team. American industry in these mechanized days is an essential "sixth column." To get capital and labor to pull together as a team, we need experienced drivers. That is the first and fundamental requirement.

Free speech is still being tolerated in America. It is permissible to say that neither capital nor labor has confidence in the ability of those now in the driver's seat to deliver the goods at the designated destination.

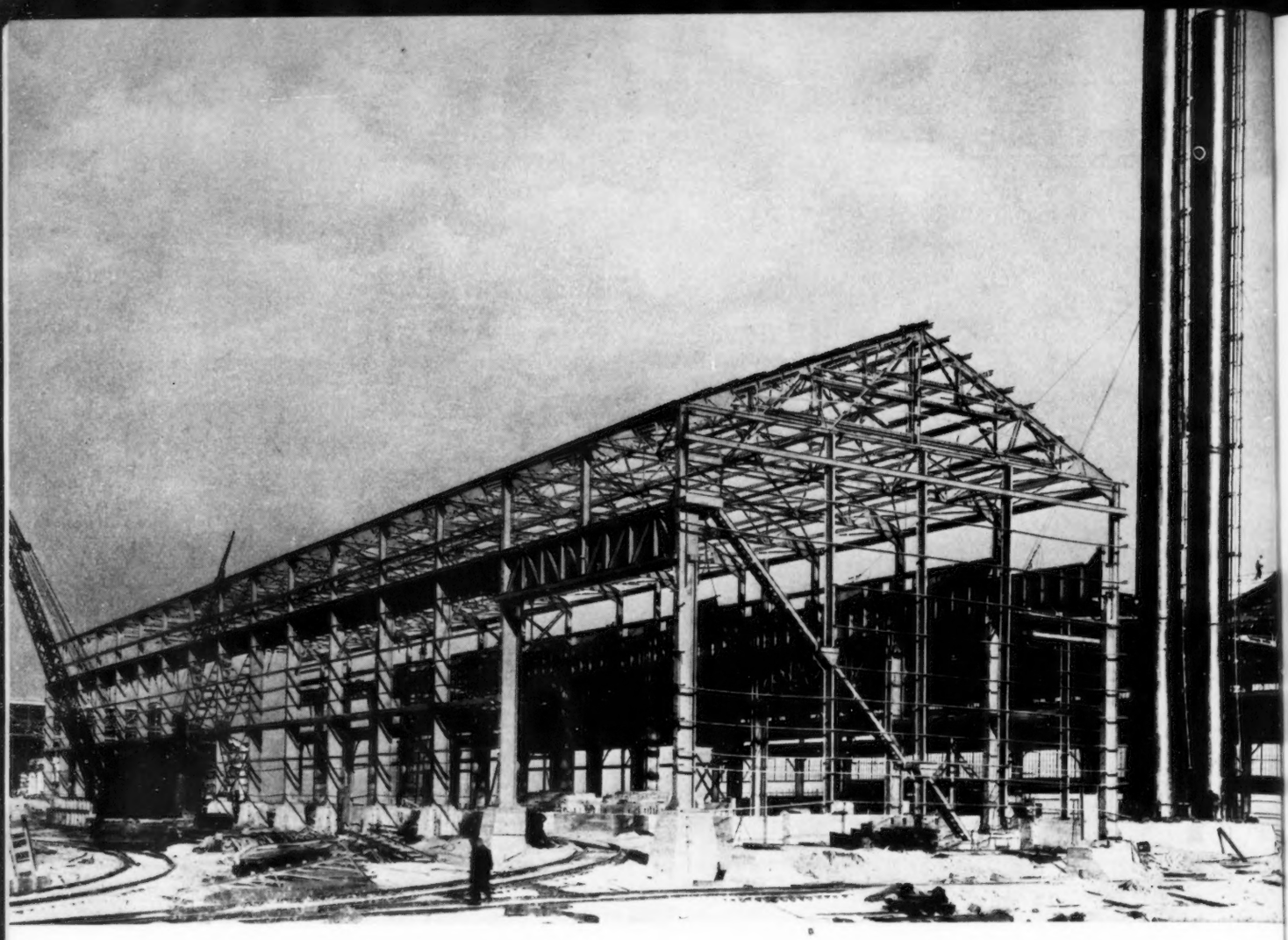
First and foremost in a preparedness program is the position of Secretary of War. It cannot be properly filled by a Charlie McCarthy who is unknown to industry, unknowing of it and who does not even broadcast. Assistant Secretary of War Louis Johnson is the man for that job. He has been doing the work, let's give him the title.

Under him should be at least three assistant secretaries or district managers in charge of a specific activity such as aircraft, mechanized equipment and essential materials. Each man should be of the caliber to command public respect on the basis of past performance.

And most particularly, they should be men who command the respect of labor, for American labor has more at stake in the preservation of Democracy than any other group in this country. It might be a good thing to have William Green and John Lewis suggest names of outstanding industrialists for these jobs. They know who's who, who don't and who do.

A little horse trading at this time may get us across the stream before the water gets too high.

J. H. VanDeventer



An Opportunity for Fabricators to *Increase* Sales!

Manufacturers of machine tools long ago adopted the sound selling practice of proving to their customers that machine tools of new designs make better products at lower costs. The reward for these alert and untiring sales efforts has been a vastly greater volume of machine tool orders.

Fabricators of structural steel can take that page from the machine tool industry's "success book." Never before have fabricators had so many good arguments, including low interest rates, with which to get new business. Thousands of manufacturing plants are doing business in buildings which are a handicap to efficient manufacturing. Today the industrial architect, contractor and fabricator do far more than simply build. They can make structures that are really "tools" for manufacturing, tools that will give the manufacturer a valuable advantage in lowered costs and higher profits.

Yet, thousands of manufacturers are not fully aware of these facts. Many are struggling along in outmoded structures that are a definite business handicap. Fabricators who will step out and sell structures in which better products can be made at lower cost will open a new realm of opportunity. Inland engineers are especially equipped by many years of practical experience to give fabricators valuable engineering assistance. It is free for the asking.

INLAND STEEL CO.
38 S. Dearborn Street, Chicago
Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City, Cincinnati

SHEETS • STRIP • TIN PLATE • BARS • PLATES • FLOOR PLATES
STRUCTURALS • PILING • RAILS • TRACK ACCESSORIES
REINFORCING BARS

use..

INLAND STRUCTURAL STEEL

CASE CARBURIZATION OF STEEL

By E. G. MAHIN

Department of Metallurgy, University of Notre Dame, Notre Dame, Ind.

HEREIN, the author considers the entire field of case carburization of steel in detail, correlating all information in easily understood form. In this the first of two parts, attention is directed primarily to pack carburizing —the reactions involved, the sources of carbon, the role of energizers, the influence of temperature, time, etc.

FOR the great majority of uses of metals in construction, the alloy is chosen and its heat treatment and methods of fabrication are ordered so as to produce mechanical properties which are more or less uniform throughout the piece. However, there are certain service requirements which indicate the need for a hard surface—adapted to resist wear, abrasion, penetration, or other surface injury—upon a body of metal which does not possess the accompanying brittleness of the hard surface and which therefore will withstand shock stresses without danger of failure. A few examples of such requirements are to be found in ball and roller bearings, gear teeth for exacting duty, and cam shafts and piston pins for gasoline motors. These examples serve merely to suggest others of the manifold applications of surface hardening in engineering construction.

Since the majority of such requirements are noted where simple or alloy steels are to be employed, the necessary gradation of properties may be met in one of three commonly used ways: (1) Case carburization, the body of the piece being of low carbon steel which will retain considerable shock-resisting qualities even after quenching treatments while the surface layer, to a suitable depth, is converted into high carbon steel, responsive to heat treatment; (2) nitriding, the surface layer being hardened by the introduction of nitrogen; or (3) cyaniding, which is a combination of these treatments, both carbon and nitrogen being introduced into the surface of the low carbon body of the piece.

In certain cases surface hardening is attained by plating with a hard metal, such as chromium, but this treatment is of limited application and it is employed, if at all, for other reasons than the mere production of surface hardness. (Flame hardening and induction hardening are practiced for similar purposes but these processes are outside the scope of this article.)

Conversion of the surface of a low carbon steel into a high carbon steel is usually discussed under the general headings of "pack" ("box") carburizing, gas carburizing, and liquid carburizing. In the last analysis all of these are gas carburizing processes, since only a gas in which carbon is one of the essential elements can perform the hardening action.

Pack Carburizing

Pack carburizing is really an adaptation, to a different purpose, of the old "cementation" process for making steel. The cementation process for making tool steels from wrought iron (sometimes followed by crucible melting) furnished practically all of the commercial steel of any important industrial use, prior to the introduction of the Bessemer process. In carrying out this process, puddled wrought iron bars were packed in charcoal in refractory boxes and heated for varying periods, running into several days, at temperatures necessary to keep the iron in what is today designated as the *gamma* form. In this form iron is capable of holding carbon in solid solution and the bars gradually acquired carbon from the charcoal. This action naturally occurred only at the surface of the bars and, as carbon migrated toward the axis of the bars, a gradient of carbon concentration was

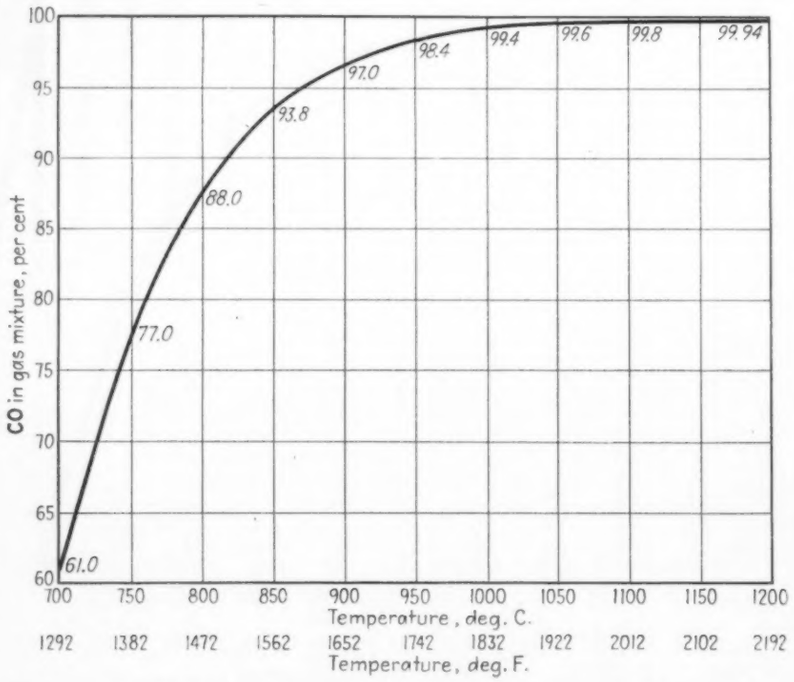


FIG. 1—Equilibrium relations of the two oxides of carbon (CO and CO_2) in the presence of solid carbon.

the result. This concentration was highest at the surface and lowest at the axis of a bar.

This condition of variable carbon content was undesirable for the finished piece of steel and it was remedied either by repeated piling and rolling of the bars at forging temperatures, or by melting the cut bars in crucibles. The last method produced crucible steels of uniform carbon content.

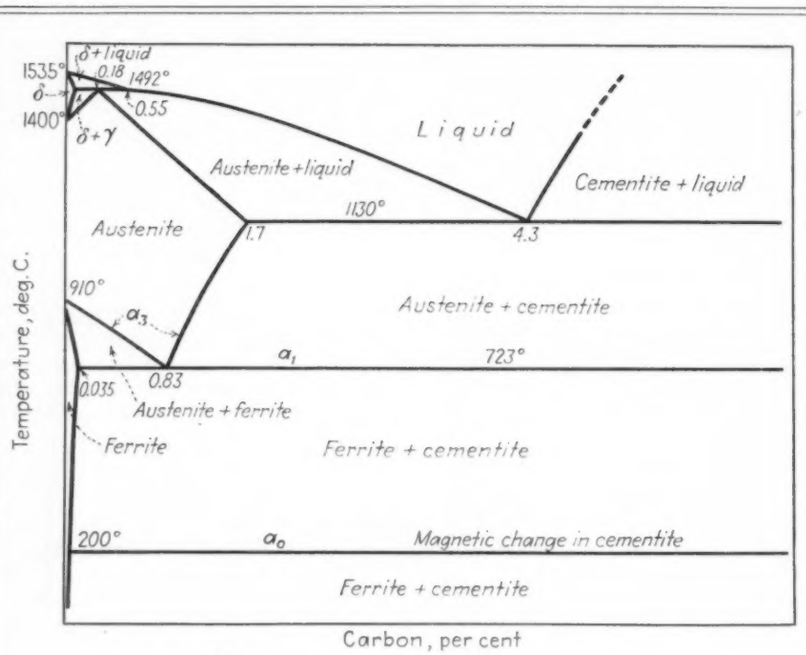


FIG. 3—Iron-carbon phase diagram.

The object of case carburizing is the same as that of the process of manufacture of cementation steel in one respect in that carbon is to be imparted to the low carbon base but quite different in another, its specific purpose being to produce a relatively shallow "case" of hardenable high carbon steel while the body, or "core," is left in its original low carbon state. The chemical and physical reactions of case carburizing and of the manufacture of cementation steel are identical.

Pack Carburizing Reactions

Fundamentally, the reactions occurring during the operations of pack carburizing appear to be quite simple. The steel piece to be case carburized is packed in a suitable metal container in such a manner as to be entirely surrounded by a carbon-containing material in granular form. The cover is luted in such a manner as to prevent excessive interchange of box gases and air, the assembly is then brought to the desired temperature, and it is there maintained until a case of predetermined depth and character is produced.

When heated in air or in pure oxygen carbon forms both carbon monoxide and carbon dioxide, represented by the formulas CO and CO_2 respectively. The first will *impart* carbon to iron or steel when at a sufficiently high temperature, the second will *remove* carbon from steel. The first is therefore a carburizer, the second a decarburizer.

In an enclosed space, such as the carburizing box, the oxygen of the air which bathes the steel piece, and the carburizer granules, begins to combine with carbon as the temperature rises, very slowly at first but more rapidly at higher temperatures. Both oxides of carbon are formed and the ratio of the concentrations of these two gases is a function of temperature. The equilibrium concentrations are illustrated in Fig. 1, in which the per cent of carbon monoxide in the gas mixture is plotted against the temperature. Considering the opposing actions of the two oxides of carbon, as just stated, it may be seen that the matter of carburizing temperature is one of great importance. Successful carburization could not be expected to occur within the lower temperature ranges, where the carburizing effect of carbon monoxide is so nearly counteracted by the decarburizing effect of carbon dioxide.

(Carburizing temperature will also be considered later as related to the migration rate of carbon in the steel.)

With the understanding that carbon

monoxide is the active carburizing agent, the various stages in the process may be indicated as follows:

(1) C + O_2 of air → CO_2, in the lower temperature ranges.

(2) $CO_2 + C \rightleftarrows 2CO$ as the temperature rises. This is a reversible reaction, coming to equilibrium of the two gases at relative concentrations which depend upon the temperature.

(3) CO dissolves in the surface layer of the steel, the iron being now in the *gamma* modification, capable of holding carbon in solid solution. In this solution:

(4) $2CO \rightleftarrows CO_2 + C$. Again this is a reversible reaction, which proceeds toward the right because of the return of carbon dioxide to the surrounding space and because the elementary carbon remains in the solid solution, austenite, and continues to diffuse into the steel, away from the surface.

The carbon dioxide formed in reaction (4) reacts with carbon of the carburizing compound:

5) $CO_2 + C \rightleftarrows 2CO$.

Reactions (2) and (5) are seen to be the same, and reaction (4) is the same reversible change, written in the opposite direction. Continued carburization depends upon keeping the equilibrium of reactions (2) and (5) shifted to the right, in the space surrounding the steel, and to the left in reactions (3) and (4), within the body of the steel. The first condition is obtained by having a large excess of carbon in the box and by keeping the temperature sufficiently high; the second by continued diffusion of carbon in solid solution, away from the surface and toward the core of the piece, and by return of carbon dioxide to the surrounding space.

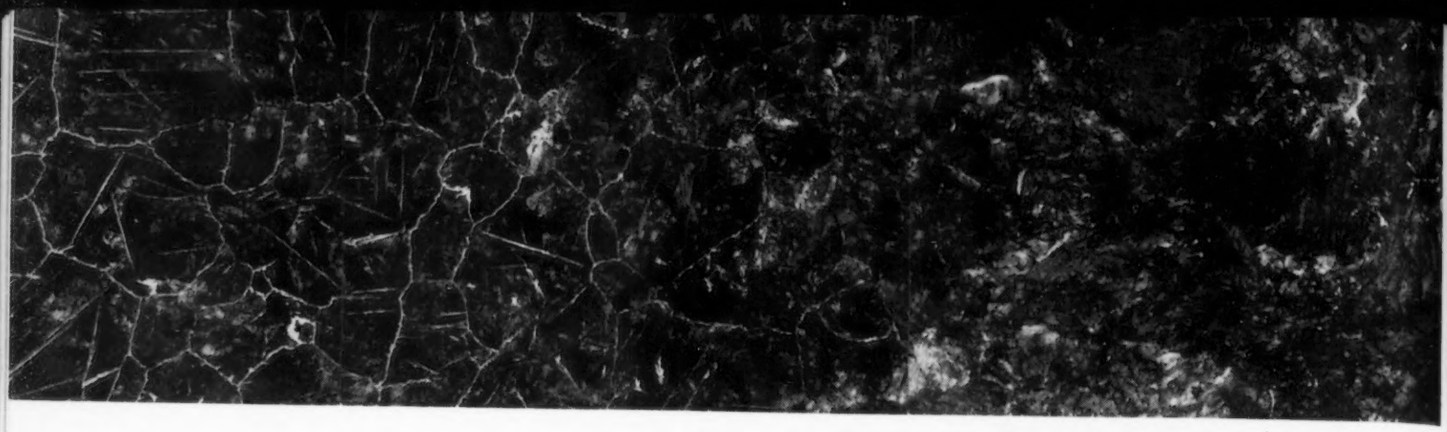
The entire process, once started by formation of sufficiently high concentration of carbon monoxide, is thus a continuous one, so long as an adequate supply of solid carbon is available and until the iron has reached a condition of saturation with carbon. In practice the end is never reached by either of these causes. A large excess of carburizing compound is provided and the process is stopped as soon as carbon has diffused far enough into the steel to produce a case of small depth. The quantity of air ordinarily inclosed with the granular carburizer is sufficient to start the process and no further supply of oxygen would be required, if no losses should occur.

Carbon Sources

From the preceding discussion it might appear that practically any material which would furnish an adequate supply of elementary carbon would serve as a practical carburizer. Theoretically this is true and such materials as charcoal from hard or soft woods or from corn cobs, coke from coal, coal tar or petroleum, lamp black, sugar char, and many other substances, will do. Aside from the item of excessive cost, some of such carbon sources are ruled out because it is found that they are too slow in action, or because they contain excessive amounts of injurious impurities, such as sulphur.

Correct porosity is important because it permits ready reaction of carbon with oxygen at the beginning, and with carbon dioxide as the process continues, and because it makes possible ready movement and circulation of the gases in the carburizing box. It must be remembered that the continuous cycle of reactions (4) and (5) depends

FIG. 2—Microstructure of the case: (Left) Hypereutectoid; pearlite and primary cementite. (Middle) Eutectoid band; pearlite. (Right) Part of gradation zone; pearlite and primary ferrite. At 50 diameters.



Composite photomicrograph taken across

for speed upon ready diffusion of carbon monoxide to the surface of the steel and of carbon dioxide from the steel surface to solid carbon in the surrounding space. Even if a given form of carbon is obviously porous it sometimes is found to serve as a slow carburizer, apparently because of the surface condition of the carbon particle. This is true of lamp black, of graphite, and of most forms of carbon derived from cracking hydrocarbons in such a manner as to form a soot.

Many commercial carburizers are available to the trade, for use in the production plant. As produced and offered for sale by reliable manufacturers, most of the various brands are dependable if properly selected with regard to the type of steel to be carburized and the character of case desired. In the manufacture of these special carburizers control of variations in carbon quality, of size and porosity of granules or pellets, and of the nature and quantity of "energizer" (see paragraphs following) are given attention. If the manufacturer of the carburizer is provided with adequate information with regard to the nature of the steel stock, the service which the fabricated part is to perform, and the depth and character of case desired, his advice regarding the carburizer to be selected and the conditions under which it is to be used should be valued and should be followed, except as variations indicated by practical use in the plant may suggest themselves.

Energizers

While carburization may be effected by carbon alone, as with charcoal in the earlier manufacture of cementation steel, for case carburization the action is too slow for practical use. In order to accelerate the absorption of carbon by the steel piece various materials known under the general term of "energizers" are always incorporated with the carbon base of the carburizing "compound." The usual manufacturing procedure includes grinding of the carbon base, mixing it with the appropriate amount of energizing compounds and with a binder, such as cheap molasses, forming into pellets or granules of proper size, and baking.

The action of the energizer in accelerating the absorption of carbon by steel is not difficult to understand. Almost invariably the selected energizer is a metal carbonate which will slowly decompose at the carburizing temperature, yielding carbon dioxide. This is illustrated by the behavior of barium carbonate, an excellent energizing compound:

$$BaCO_3 \rightleftarrows BaO + CO_2$$

Carbon dioxide so produced reacts with solid carbon, producing the active carburizing gas, carbon monoxide, thus enriching the gas mixture in this essential compound:

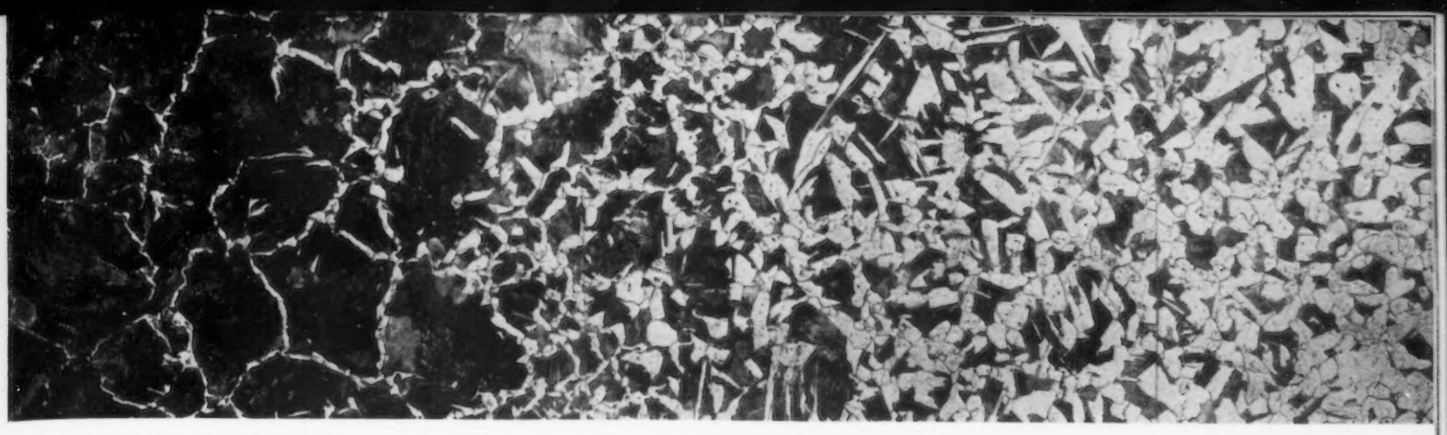
$$CO_2 + C \rightleftarrows CO^1$$

In order to understand the action of energizers and the need for such accelerating agents it is necessary to recall the fact that the air inclosed in the carburizing box contains only about 22 per cent, by volume, of oxygen, the remainder being entirely inactive nitrogen. The equilibrium curve, Fig. 1, shows that at 700 deg. C. (1292 deg. F.) a mixture of the two oxides of carbon, in contact with solid carbon, would contain about 61 per cent of carbon monoxide, this concentration rising to 98.4 per cent at 950 deg. C. (1742 deg. F.). But this is far from representing the true concentration of the active carbon monoxide, for three reasons: (1) The original air in the box has its oxygen diluted with 78 per cent of inactive nitrogen and this reduces the concentration of carbon dioxide—later carbon monoxide—that can be formed; (2) thermal expansion of the gases in the carburizing box, as the temperature rises to the carburization range, causes a loss of about three-fourths of the original volume. The net result of these two reductions is that at the carburizing temperature only about 5.5 per cent of the orginal air inclosed in the box is represented by oxides of carbon; (3) the formation of carbon monoxide from ogygen and carbon results in the production of double the volume of the original oxygen. This causes further expulsion of gas from the box and further reduction of the effective amount of carbon monoxide.

This surprisingly small amount of carbon monoxide in the box can effect only slow carburizing action. The energizer acts to form this necessary gas as heating progresses and as this is a fairly cheap source of carbon monoxide it may be used in quantity sufficient to drive much of the original gas mixture from the box, through crevices in the luting. As this amounts to a replacement of a nitrogen-diluted carbon monoxide by a nearly pure gas, it serves to speed the reactions of carburization in a practical way.

In order to be of any practical service in carburizing, an energizer must not decompose and evolve its carbon dioxide too rapidly or within too low temperature ranges, in which case later backward diffusion of atmospheric nitrogen through leaks in the luting would again dilute the active gas. Neither should the energizer be too difficult to decompose, thus being too slow in action to prevent dilution by backward-diffusing nitrogen from outside air. A mixture of carbonates is sometimes used, containing a fairly easily decomposed carbonate which will cause early formation of carbon dioxide and thus expel much of the atmospheric nitrogen from the box, also a more stable carbonate which will slowly evolve carbon dioxide with rising temperature and which will maintain this evolution over a considerable time. From this standpoint it may be understood why calcium carbonate proves to be a poor energizer. Its decomposition occurs early in the heating process and, while it does serve a useful purpose in expelling air

[1] This is the view of energizing action which has long been held and which the writer believes is correct. Other suggested explanations have been offered by Ragatz and Kowalke (*Metals and Alloys*, Vol. 2, pp. 290 and 343, 1931), and by Enos (*Transactions*, American Society for Steel Treating, Vol. 20, p. 27, 1932).



the case of a carburized steel.

from the box and in replacing this air with carbon dioxide which later forms the monoxide, its action diminishes and becomes nearly negligible in the later stages of the long heating. On the other hand, barium carbonate or sodium carbonate continues to yield carbon dioxide over fairly long periods of time, and these carbonates are used in practice to a considerable extent.

Carburizing Boxes

Rolled or cast steel is suitable material for carburizing boxes. In time the steel becomes heavily carburized from the inside, and burned and decarburized on the outside. Embrittlement from within and gradual scaling and destruction from without limit the useful life of steel boxes. Cast alloys of nickel and chromium are the most satisfactory materials for box construction. The first cost is relatively high but long life and freedom from troubles more than compensate for this disadvantage. These alloys satisfactorily resist oxidation at carburizing temperatures and they do not themselves absorb carbon.

Steels for Carburizing

Since carburizing and hardening treatments are designed only to provide a hard surface, of maximum wear resistance, the mass, or body, of the piece must be of such composition as will furnish the mass strength required for service. Plain carbon steels having carbon as low as 0.15 per cent, or as high as 0.4 per cent, are used. Properly chosen alloy steels will provide greater mass strength and for this purpose chromium, nickel, molybdenum, vanadium, or manganese steels are used. Some of the alloying elements —notably chromium and vanadium— also promote fine grain structure.

Character of Case

Two factors are important in this connection. The necessary depth of case is determined by such considerations as the required mass strength of the case and the amount of wear normally to be expected. The depth of case required in different types of service may be anywhere between a few thousandths of an inch to ⅛ in., or even more in special instances. Extremely shallow cases are required only for superficial resistance to light wear. They are more often formed by cyaniding than by box carburizing.

The carbon distribution in the case is quite another matter. The carbon gradient—the line representing carbon per cent plotted against case depth—may be quite steep, high carbon at the surface running rather abruptly to the low carbon core; or it may have a small slope. With a given carbon gradient a further item to be considered is the actual hardness required at the surface. This determines the optimum carbon content for the surface layer because the surface hardness after thermal treatment varies more or less directly with the per cent of carbon at the surface.

Assuming a given steel composition and a given commercial carburizer, the character of case will be determined by the temperature and the time at the carburizing temperature. These factors will be considered separately.

Carburizing Temperature

Earlier notice was given to the fact that in the gas mixture in the carburizing box the ratio of carbon monoxide, the active carburizing agent, to total gas volume increases with rising temperature. This fact alone points to more rapid carburizing at higher temperatures, the law of mass action applying here as in other chemical and physical reactions. This would indicate a steep carbon gradient in the case, carbon absorption tending to build up a high carbon concentration near the surface.

But higher temperatures also cause more rapid carbon migration toward the core, thus nullifying the absorption factor to a certain extent. Assuming a fairly efficient combination of carbon base and energizer, experience shows that higher temperature affects the absorption factor to a greater exent than it does the migration factor.

Carburizing Time

Having selected a carburizing temperature as high as may be employed without building up excessive carbon concentration near the surface, the time factor will be determined by the case depth required. In commercial practice the time at full carburizing temperature may be anywhere from 1 or 2 hr. to 20 hr.—sometimes even more—according to temperature and case depth wanted. As already noted, lower temperatures call for longer time for the production of a case of specified depth.

A proper consideration of all of these influences might appear to be a somewhat complex matter, but this may perhaps be simplified by the following summary:

(1) NATURE OF CARBON BASE AND SIZE AND POROSITY OF GRANULES. The rate of reaction with oxygen or with carbon dioxide is directly related to the rate of absorption.

(2) NATURE AND QUANTITY OF ENERGIZER. Affect the rate of carbon absorption directly, as they serve to increase the effective concentration of carbon monoxide.

(3) RATE OF ABSORPTION OF CARBON. Higher rates tend to build up higher concentration of carbon in the surface layer of the steel.

(4) TEMPERATURE FOR CARBURIZING. Higher temperatures increase both rate of carbon absorption and rate of carbon migration, but the first in a more marked way than the last. The temperature effect in carbon absorption works through (1) higher carbon monoxide concentration in the box, and (2) higher reaction rate at the iron surface and at the carburizer granules. In the matter of carbon migration the temperature naturally has to do with atomic mobility and the diffusion rate of carbon after it has entered the steel.

(5) SLOPE OF THE CARBON GRADIENT. Considering the effects noted in

(4), it follows that a steep carbon gradient in the core will be promoted by use of high carburizing temperatures, a more gradual slope by lower temperatures. On the other hand, longer time periods at the carburizing temperature will be required for a given case depth than if higher temperatures are employed.

The question may then be asked: How is the man in charge of production going to determine all of these factors and the summation of their effects? The answer is that he should not expect to do so, except in a qualitative manner and as checked by his experimental results. This does not make the case as hopeless as it may at first appear. The superintendent of production should possess a certain knowledge of principles, which will enable him to make a close guess as to requirements of procedure on a new job. He must be able to analyze his results and to make intelligently considered modifications in practice, as indicated by these results. But he should feel also that he can assume expert knowledge on the part of the organization of the carburizer manufacture, so that advice from the manufacturer may be safe for a starter on new work. It is as illogical and as senseless to order simply "a carburizing compound" as for the farmer to order "a mixed fertilizer" for his soil, knowing nothing of the qualities of his material. Or for the householder, surveying the years of accumulation of prescriptions and nostrums in his family medicine cabinet, to decide that if he dumps them all into one large bottle he will have a mixture which may be relied upon for the curing of almost any family ill.

Fortunately it is true that reputable manufacturers of carburizers, and of other heat treating specialties, do have in their organizations experts who study in their special fields, and whose advice is reliable where new requirements are to be considered.

Per Cent Carbon in Surface

Every carburized piece is to be subjected to thermal treatment, which is designed to accomplish two results: (1) To produce maximum hardness at the surface, and (2) to accomplish the maximum grain refinement in both case and core, fine grain structure being intimately related to mechanical strength.

Considering both time and temperature factors, any desired carbon concentration may be obtained at the surface, up to perhaps 1.2 per cent. As it is well recognized that higher carbon content results in higher hardenability, it might be assumed that the maximum carbon content at the surface layer would be most desirable. This is not necessarily true.

Any steel having a carbon content greater than approximately 0.85 per cent is known as "hypereutectoid," and after slow cooling (the normal procedure in box treatment) its microstructure will be composed of primary cementite, a very hard and brittle phase, as an envelope (a network, in cross-section) surrounding pearlite grains. If present in larger amount, as with much higher carbon content, primary cementite may occur also as plates (needles, in cross-section) crossing pearlite grains.

At approximately 0.85 per cent of carbon the steel is "eutectoid," and after slow cooling its microstructure shows that it is all pearlite. And if the carbon content is lower than this figure, as in the "gradation zone" and in the core, the steel is "hypoeutectoid" and in microsection both pearlite and primary ferrite appear, ferrite being the softest and weakest phase of any steel.

All of these structures are shown in Fig. 2, which is a photomicrograph taken across the case of an excessively carburized low carbon steel, cooled in the carburizing box. Such a carburized and slowly cooled steel is in its annealed condition and it requires a reheating and quenching treatment for both hardening and grain refinement.

In accordance with the iron-carbon phase diagram (Fig. 3) the box-cooled steel must be heated into the austenitic temperature range before quenching, in order that all pearlite may be converted into austenite and that this austenite may re-absorb any primary cementite. It happens that, even though the iron-carbon diagram does indicate the solubility of cementite at any specified temperature, the time element enters because cementite is rather sluggish in the matter of redissolving. If the steel has been heavily carburized, with much of a hypereutectoid outer zone and fairly heavy cementite network present, the total reabsorption of this cementite may require long heating with consequent grain growth. If insufficient time is given at the high temperature and if not all of the cementite has been redissolved, this hard and brittle phase will remain as envelopes or cells. This is likely to cause "spalling" (cracking) of the case, in service.

For these reasons it is usually desirable that any hypereutectoid outer zone shall be limited to small depth. If the cellular envelopes of cementite are quite thin they will be more readily re-absorbed into the austenite, and if the hypereutectoid zone is shallow most of it will be removed during the finish grinding which is necessary after carburization and heat treatment.

Carbon Gradient Slope

A very steep carbon gradient in the gradation (hypoeutectoid) zone of the case, signifying an abrupt change from the high carbon case to the low carbon core, is always undesirable. Stress concentration in this zone results and spalling of the case is likely to occur in service.

A steep carbon gradient may result from improper balance of rate of carbon absorption and rate of carbon migration. If absorption too far outruns migration an abrupt and narrow gradation zone will result, carbon "piling up" in the surface layers more rapidly than it can diffuse inward. This would be true, for example, if a "fast" carburizer were used in the lower temperatures of carburizing ranges. On the other hand, if a "slow" carburizer is used at high temperatures, migration more nearly keeps pace with absorption and a deep case may be obtained without excessive carbon content at the surface and without an objectionably steep curve of carbon concentration in the gradation zone. An understanding of these principles will usually point the way to proper selection of type of carburizer and to proper working procedure.

Slow, Fast Carburizers

At a specified temperature, variation in the speed of carbon absorption may be governed to a certain extent by (1) the type of carbon selected for the carburizer base and (2) the kind and quantity of energizer used in the carburizing compound. Admixture of certain ferroalloys also has been found to slow the carburizing action, thus making possible the use of higher temperatures, with resulting shortening of the time for production of a given case depth.[2]

Naturally there are many needs for hard surfaces on mild steel where localized service stresses are not to be expected, in which instances spalling is not probable. Very rapid carburization may then be desirable for the production of thin, hard cases. Cyaniding (see next week) serves well in many of such uses.

Ed. Note:—Next week the author concludes with data on the pearlite band in the case, heat treatment of carburized steel, gas and liquid carburizing, and selective carburizing.

[2]U. S. Patent No. 1,921,367.

"DOUBLE BOILER" FOR MELTING ZINC

ONE of the problems that has come up in connection with the use of zinc and zinc alloy drop hammer dies in the aircraft industry has been the melting of the zinc in such a way as to avoid iron pick-up from the pot. As indicated in an earlier article,* overheating increases the amount of iron pick-up from the pot, and in the example of magnesium-aluminum zinc base alloys, keeping the melting temperature below 900 deg. F. is the chief cure for iron contamination. Iron pick-up may still occur from local hot spots in the pot, however, due to impingement of oil or gas flames or the like. To eliminate such local hot spots in zinc melting pots, an interesting "double boiler" arrangement has been devised by the Glenn L. Martin Co. at Baltimore, said to be the largest aircraft factory in the United States. Patents have been taken out on the furnace construction.

As can be seen in the line drawing, the zinc melting pot proper is suspended in a larger pot which is filled with molten lead. The outer pot comes in contact with the combustion flames, and the heat is evenly distributed to the inner pot through the lead. When melting 99.99 per cent pure zinc, a layer of molten lead is also left in the bottom of the zinc pot. It is believed by Martin engineers that the inner pot will last for an indefinite period, and that cheaper grades of steel may be safely used for such pots, since the inner pot is spared the eroding effect of the zinc at the points of extreme heat.

Rather recently, however, in line with the current trend the Martin company has adopted the use of Zamak 5, one of the zinc-base alloys mentioned above, in place of straight zinc for drop hammer dies. When melting this material in the Martin furnace, the molten lead as shown in the bottom of the zinc chamber of the melting chamber, is not used because the strength of such alloys is seriously affected by the presence of even minute quantities of lead in the mix. Nor is steel plate used for the inner pot construction. Peculiarly enough, these zinc alloys have a very erosive effect upon steel, though straight zinc does not. Martin engineers have found that a special analysis of cast iron serves much better and when melting such alloys gives a life comparable to steel pots when melting straight zinc in the Martin furnace.

* "Zinc-Alloy Dies for Drop Hammer Work," by W. W. Broughton, THE IRON AGE, Feb. 8, 1940.

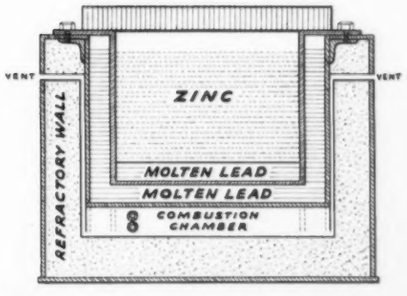


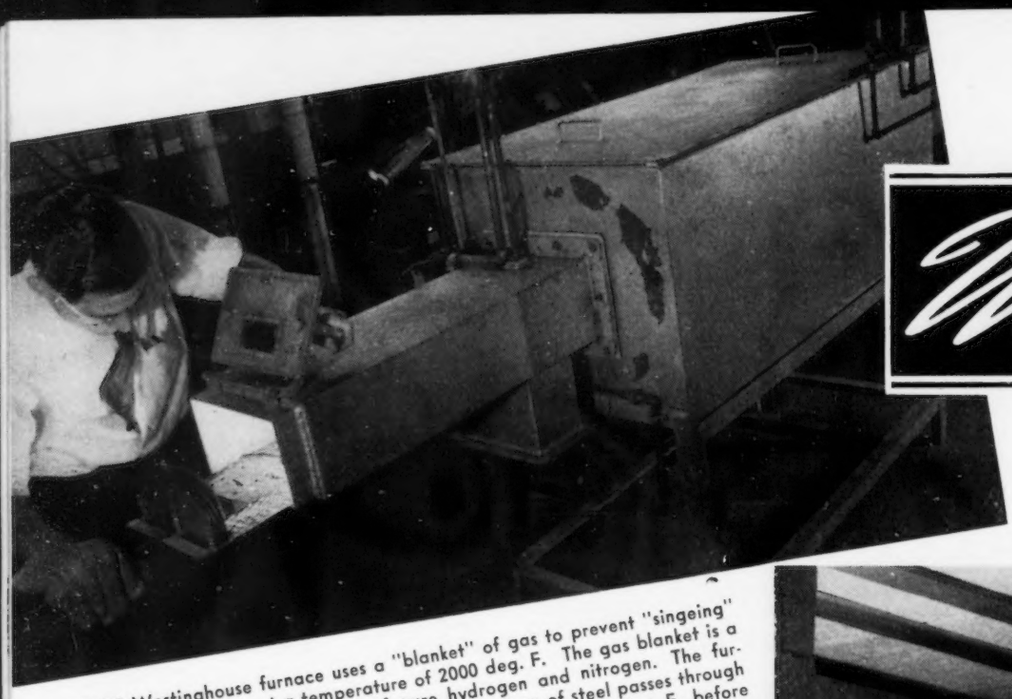
DIAGRAM of the Martin "double boiler" furnace for melting straight zinc for drop hammer dies. No lead is to be found in the bottom of the inner pot when zinc base alloys are being melted.

o o o

AT RIGHT

LADLING zinc from a battery of Martin double boiler furnaces. Because the dies poured are often of large size, the ladle is almost as big as the pot and is filled through a plugged gate in the bottom.

What's

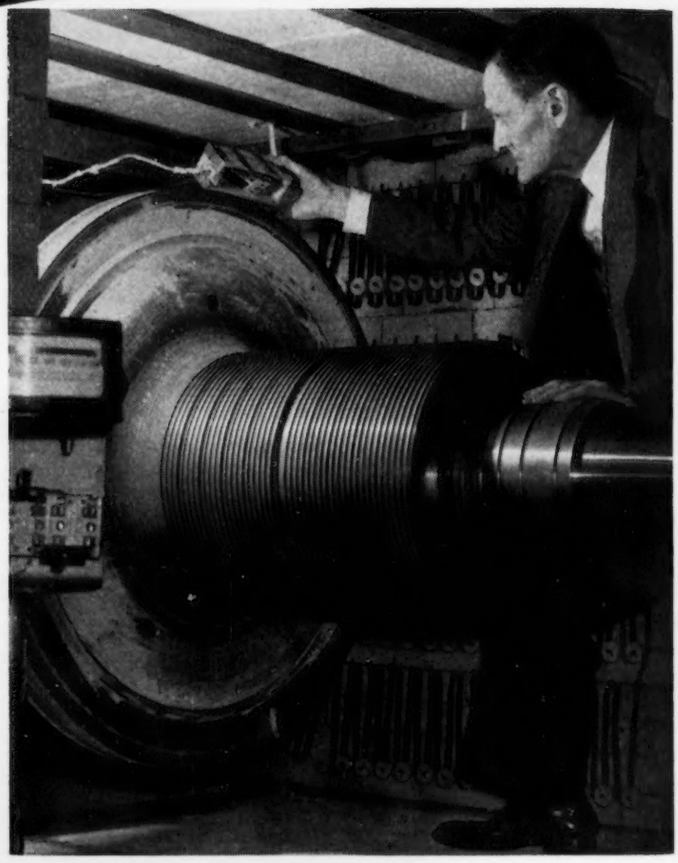


THIS Westinghouse furnace uses a "blanket" of gas to prevent "singeing" of the metal while at a temperature of 2000 deg. F. The gas blanket is a delicately balanced atmosphere of pure hydrogen and nitrogen. The furnace is about 7 ft. long and so designed that a piece of steel passes through it at varying stages of heat, ranging from about 1300 to 1750 deg. F., before it cools in an air-cooled tunnel. It is claimed that the furnace eliminates distortion and formation of scale.

o o o

RIGHT

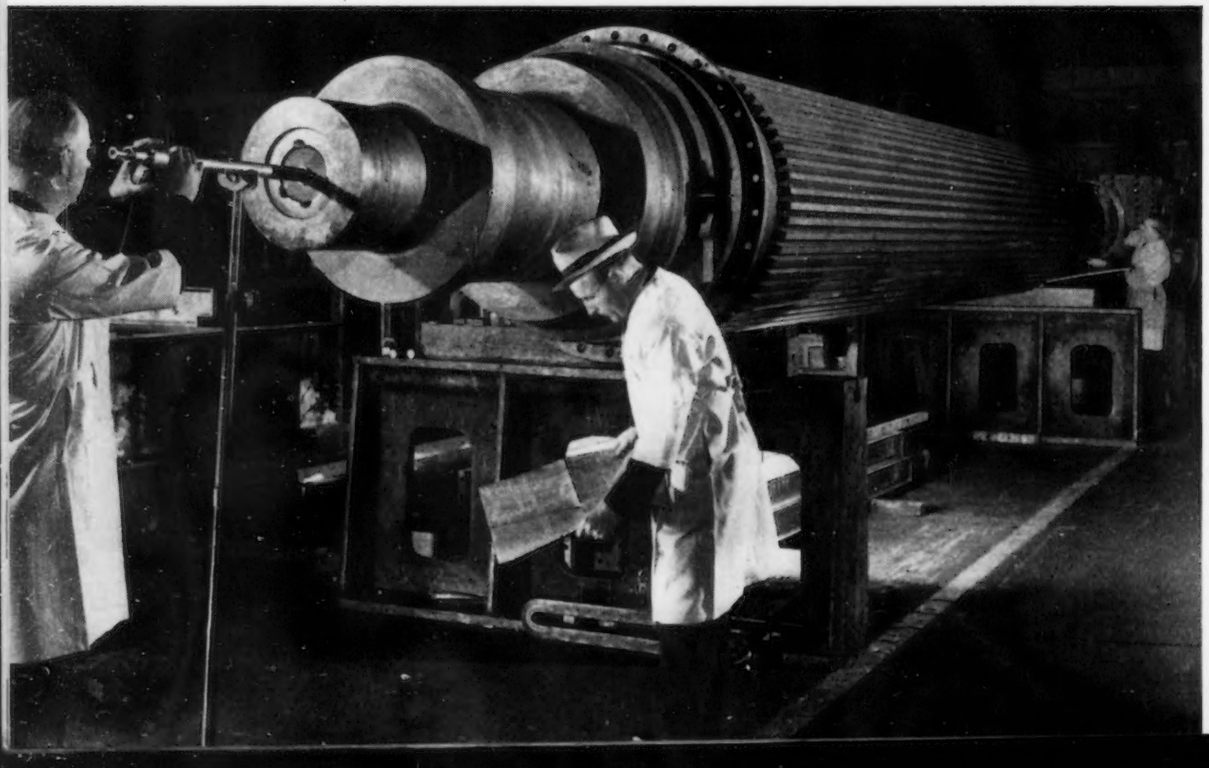
S. HOMER WEAVER, of General Electric, who developed the new process of "baking" permanent straightness into steam turbine shafts and rotors, is shown here inspecting one of the thermocouples before the run. The shaft is supported in a standard lathe bed, an electric oven is closed about it and controlled heat is applied through the strip heaters shown on the wall. As the oven heat is raised, the rotor loses its straightness. Then, at a certain critical temperature, a straightness is restored which is not affected by temperature or temperature changes.



o o o

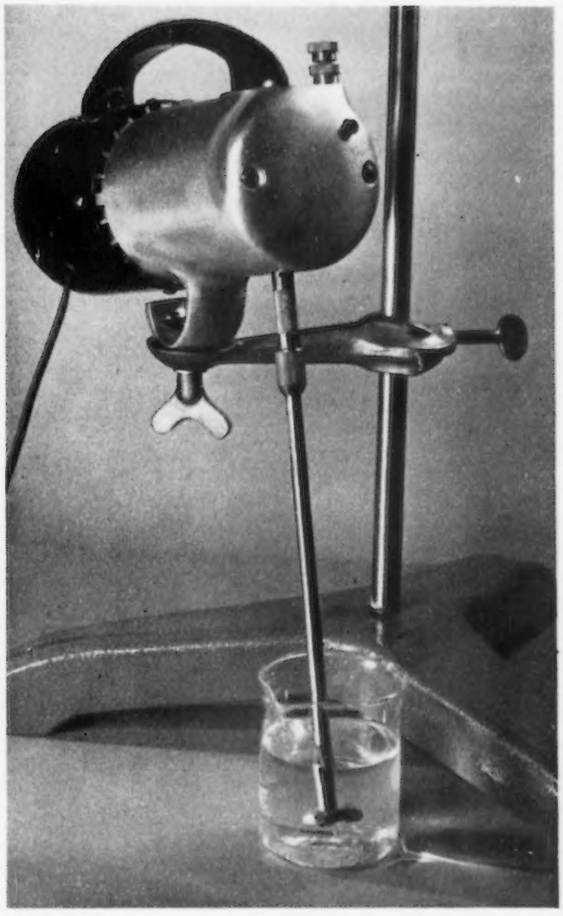
BELOW

THE peace time record of the periscope is far more creditable than its use on submarines to sink shipping. In the power field and throughout the industry, billions of dollars worth of machinery and countless lives have been protected through adequate interior inspection of large forged steel shafts. Here shown, in the Milwaukee plant of Allis-Chalmers Mfg. Co., is one of the biggest generator shafts ever built being set up for periscope inspection to make sure there are no flaws in the metal.



New!

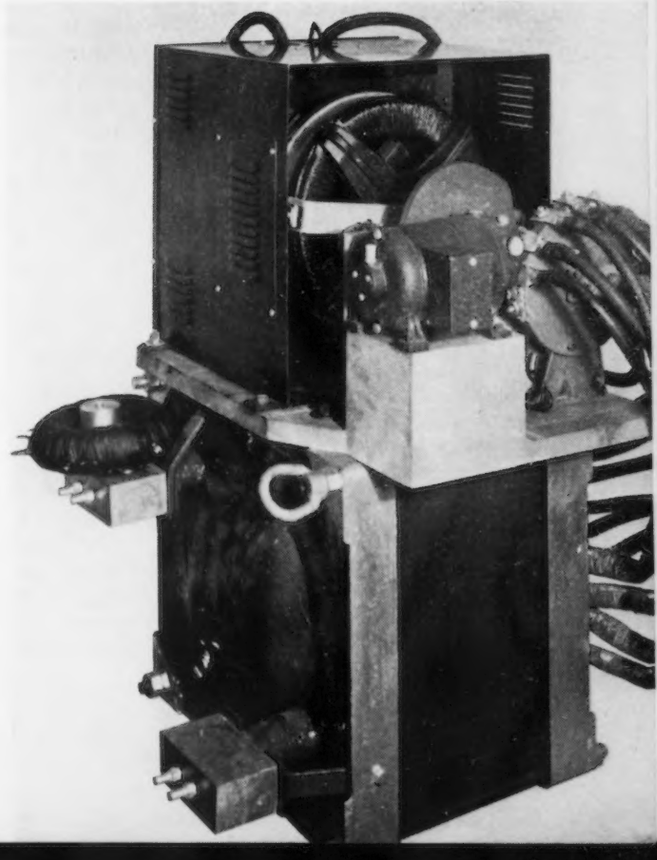
A NEW Alnico magnet for the removal of metal fragments from the eyes and from surface wounds has been devised by General Electric Co., Schenectady. Though not designed to replace electromagnets in this field, the new instrument is more powerful than earlier permanent magnets used for the purpose. Sintered Alnico, an alloy of aluminum, nickel, cobalt, iron and copper, is used with a high permeability insert of nickel iron to collect the lines of flux at the point. The magnet is light and can be handled almost as easily as a pencil.



EASY to handle, and portable, is this new model F laboratory mixer built by Mixing Equipment Co., Rochester, N. Y. The speed may be adjusted to barely turn over or increased up to a maximum of 1750 r.p.m. This model may be used in beakers as small as 300 cc. without throwing out the contents, or it may be used to agitate the contents of a 20-gal. tank.

o o o

THIS electric salt bath furnace is so designed that the furnace itself is virtually a pyrometer calling for or refusing electric power as temperature fluctuations dictate. Made by Commerce Pattern Foundry & Machine Co., Detroit, this Upton furnace is capable of doing practically any heat treating operation involving temperatures from 250 to 2500 deg. F. The resistance of the salt bath causes the current fluctuation. Galvanometer, an electric eye, relays and a system of 3000 contacts are included in the control.



PICKLING and POLISHING

DURING the latter part of 1935 and the early part of 1936 two men in New York City tackled the problem of polishing stainless steel watch case backs. These men, S. J. Blaut and Harold Lang, found that they could produce a polish on 18-8 stainless steel—silver soldered to 18 per cent nickel silver and covered with oxide scale as a result of this silver soldering operation—by treating the combination anodically in a bath containing sulphuric and hydrofluoric acids. They applied for a patent on the descaling, electro-etching and electro-polishing of stainless steels in this mixture of acid and proceeded with further development work. Numerous samples were prepared. They found that it was possible to obtain any desired degree of polishing by properly adjusting the composition of the solution, the temperature of operation, the current density used, and the time of treatment. Following along these lines, they produced numerous samples of 18-8 stainless steel. An artist was employed to develop designs and a number of art panels of various shades were produced.

During the fall meeting of the American Society for Metals in 1936, the writer showed numerous sample panels produced by Messrs. Blaut and Lang to various members of the steel industry. Examples of descaling of hot rolled and annealed straight-chrome and 18-8 stainless steels were exhibited. Examples of descaling and satin finishing of mill finished 18-8 were shown. And examples of various types of shaded etching and electro-polishing of 18-8 steels were shown. They were all looked at with interest and with skepticism. It had long been known in the steel industry and particularly in the stainless steel industry that the more a piece of steel was pickled the whiter and frostier the surface became. To say that this situation could be reversed and that the longer a piece of metal was pickled, even though an electric current was used, the brighter and more lustrous would the surface become, was rank heresy. Although the samples distinctly proved this (the samples are still available), the whole idea of electro-polishing of stainless steel was not taken with great seriousness.

In 1937 a panel board carrying a number of these electro-polished, electro-etched and descaled samples as produced by Messrs. Blaut and Lang was exhibited in the Metal Products Exhibit Hall in New York City. This was referred to in the August, 1937, issue of *Metal Industry*. A photograph of the panel which was on display at the Metal Products Exhibit was shown as Fig. 1 in the first section of this article, last week.

S. J. Blaut and H. M. Lang of New York, in United States patent No. 2,115,005 of April 26, 1938, describe their process in considerable detail. For descaling of all stainless steels a bath of about 50 per cent sulphuric and 10 per cent hydrofluoric acid is used. For electro-polishing or the burnishing process, a bath of 40 per cent sulphuric and 10 per cent hydrofluoric acid is used. Operation is at room temperature or lower and current densities are of the order of 0.5 to 2 amp. per sq. in.

While this original Blaut-Lang Process is of considerable value and has its applications, there are operating objections to the use of acid pickling baths containing 10 per cent hydrofluoric acid. The fumes are bothersome, although not as dangerous as acetic anhydride plus perchloric acid, and problems develop in connection with suitable tanks or vats for operation. Blaut and Lang continued to work intensely to develop other electro-polishing baths which would get around their difficulties. This they have accomplished and the present Blaut-Lang baths for successful operation on all types of stainless steel, nickel, monel, aluminum and aluminum alloys contain no hydrofluoric acid. These baths are the subject of further patent applications now in the United States Patent Office.

The new Blaut-Lang bath for use on all forms of stainless steel for electro-polishing has a base of phosphoric and sulphuric acids. It produces an electro-polish on all grades of stainless steel.

E. E. Lindh of Sweden, United States patent No. 2,145,518 of Jan. 31, 1939, describes a method of brightening nickel surfaces. Lindh reports the development of the use of a sulphuric acid bath of 45 deg. to 62 deg. Bé at a temperature of 140 deg. F. and with current densities of 280 to 560 amp. per sq. ft. as a method of brightening nickel plated surfaces. It is interesting to note that Proctor recommended a sulphuric acid bath of this concentration for stripping nickel. This has already been referred to as the item appearing in *Metal Industry* in 1927. Proctor, however, used current densities of only 5 to 10 amp. per sq. ft. instead of the high current densities of Lindh.

W. Sykes, of Chicago, United States patent No. 2,146,488 of Feb. 7, 1939, describes an apparatus for electrolytically pickling metals. This apparatus consists of an arrangement whereby no electrical contact need be made to the strip being pickled. High current density and either d.c. or a.c. is used. Current densities of the order of 100 amp. per sq. ft. of surface being treated are reported. The apparatus is mentioned particularly in connection with pickling in acid solutions but makes no reference to the particular kind of acid to use or its concentration.

C. W. Yerger and G. Todd, of New Jersey, United States patent No. 2,165,326 of July 11, 1939, describe a method of electrolytic treatment of ferrous metals. Their method provides an apparatus for electrolytic

# of Metals

By SAM TOUR
Vice-President, Lucius Pitkin, Inc., New York

THE electrolytic polishing of metals is currently showing considerable commercial activity. Three proprietary processes have already been presented in THE IRON AGE, and a fourth, the Blaut-Lang process in which Lucius Pitkin has an interest, is presented herein. In the first section of this article last week the author described the background and development of the idea of electrolytic polishing of metals. In conclusion, herein, attention is directed primarily to the Blaut-Lang process, its characteristics, operation and future possibilities.

pickling in sulphuric acid solutions whereby the material is made cathodic for a period and then anodic with the optional procedure of again making it cathodic. They refer to both pickling and bright dipping of steel articles by this means.

H. H. Uhlig, of Massachusetts, United States patent No. 2,172,421, of Sept. 12, 1939, describes a chemical treating process for stainless steels to develop a more corrosion-resistant surface. The treatment consists of a chemical pickle in a mixture of sulphuric and hydrochloric acids to which some titanium tetrachloride ($TiCl_4$) has been added. Forty per cent sulphuric acid, plus 30 per cent hydrochloric acid plus 5 per cent of titanium tetrachloride is recommended. No description is given of the technique to be followed in adding titanium tetrachloride to the solution or holding it in the solution once it has been added. Titanium tetrachloride is the chemical used for smoke screens and for skywriting by airplanes. Its fumes are very irritating indeed.

George Kiefer, of Allegheny Ludlum Steel Corp., The IRON AGE Dec. 21, 1939, discusses electrolytic polishing of stainless steel, and describes the use of phosphoric acid for this purpose. This process is one believed to be licensed under the Burns patent No. 1,658,222, which has been discussed previously. The conditions suggested as favorable to polishing by Kiefer and the conditions favorable for cleaning as suggested by the inventor, Burns, are given in the comparative table that follows:

	Burns	Kiefer
Solution	70 per cent phosphoric acid	70 per cent phosphoric acid
Time	3 min.	5 min.
Temperature	50 deg. C.	No control
Current density	100 amp. per sq. ft.	432 amp. per sq. ft.

Carl Schaefer, of Casco Products Corp., Bridgeport, Conn., *Metal Industry*, January, 1940, describes, "Anodic Polishing of Metals." This article is mainly a review of the numerous articles by Jacquet which have been referred to previously and which are also referred to in the January, 1940, issue of *Metal Progress* also previously referred to.

T. W. Lippert, metallurgical editor of The IRON AGE, in The IRON AGE, Jan. 11, 1940, discusses "Pickle Polished Stainless Steel." Mr. Lippert's article describes the electro-polishing process of the Rustless Iron & Steel Corp. and shows pictures of installations operating in accordance with their process. Lippert reports that the Rustless Iron & Steel Corp. employs a solution of concentrated citric and dilute sulphuric acids. No detailed data are given regarding the concentrations of acid used so it has not been possible to make complete experimental runs with the acid concentrations of Rustless Iron & Steel Corp.

Lippert reports also that the American Rolling Mill Co. (associated with Rustless in this development work) has other types of electrolytes on file at the Patent Office the characteristics of which are not known. Again it has been impossible to make experimental tests using any of these electrolytes to determine what their application might be.

Lippert also refers to processes being suggested by Battelle Memorial Institute and states that their solution composition is not divulged. Again it is impossible to make tests for comparison of results obtainable from their solutions as compared to those obtained by the solutions of others.

H. Pray and C. L. Faust of Battelle Memorial Institute, The IRON AGE, April 11, 1940, make numerous interesting comments on electrolytic polishing of metals, but they fail to give any information as to what electrolyte they use or they propose or suggest for doing the work. They propound a theory as to why electro-polishing takes place on certain metals in certain solutions, and attempt to show that Fink and Kenny equipotentializing of surfaces occurs in anodic polishing of metals. In discussing the Fink and Kenny patent, it has already been pointed out that Fink and Kenny did nothing that numerous others had not done before in anodically pickling steel in acids. It was also pointed out that if Fink and Kenny obtained equipotentializing of a surface, then everybody who ever anodically pickled steel in acids obtained a similar result.

Experimental Comparison

As the most interesting application of the electro-polishing process is in connection with stainless steel, it was decided to make comparative tests on various stainless steels with a number of the processes which have been referred to in connection with the historical part of this article.

The three common varieties of stainless steel are 18-8, meaning 18 per cent chromium and 8 nickel with carbon under 0.10 per cent; 17 chrome, meaning approximately 17 per cent chromium, little of any nickel and carbon under 0.12 per cent; and 12 to 14 per cent chromium cutlery

grade with carbon about 0.30 per cent. The 18-8 stainless steel is commonly used in two finishes known as No. 2B and No. 4 polish respectively. The No. 2B is a finish produced by pickling clean after annealing and then giving the material a slight pinch pass in the rolls. The No. 4 polish finish is obtained by the application of an emery polishing procedure. A supply of 18-8 in each of these two finishes and a supply of each of the 17 chrome and 12 chrome varieties of stainless steel was purchased. The material was cut into 3x1½ in. panels and a number of panels of each type of stainless steel were treated by each of seven methods. The seven methods will be described below:

Method No. 1: Blaut-Lang process as covered by patent applications. This treatment is in a bath of phosphoric acid and sulphuric acid. In these tests a temperature of 180 deg. F. and a current density of 3 amp. per sq. in. were used. The 18-8 No. 2B finish was treated for 4 min., the 18-8 No. 4 polish was treated for 5 min., the 17 chrome stainless steel for 5 min., and the 12 chrome stainless steel for 7 min.

Method No. 2: Allegheny-Ludlum process as described by Kiefer in The Iron Age, Dec. 21, 1939, using 70 per cent phosphoric acid, a current density of 3 amp. per sq. in., a time of treatment of 5 min., and with no temperature control.

Method No. 3: R. M. Burns and W. C. Warner, patent No. 1,658,222 of Feb. 7, 1928, assigned to Western Electric Co. and believed to be the patent under which Allegheny-Ludlum is operating. The principal difference in the process described in Burns' patent and its application by Allegheny-Ludlum Steel Corp. as described by Kiefer is a change in time and current density. In the tests being described, a 70 per cent phosphoric acid solution was used at 50 deg. C. for 3 min. with a current density of 100 amp. per sq. ft.

Method No. 4: Colin G. Fink and F. H. Kenny, United States patent No. 1,961,752 of June 5, 1934. In accordance with the preferred practice described in this patent, a bath of 42.5 per cent chromic acid was used at a temperature of 40 deg. C., and a current density of 0.06 amp. per sq. cm. This is equivalent to 0.39 amp. per sq. in. In accordance with the patent recommendations, the time of treatment was 1 hr.

Method No. 5: James D. Kelvie, United States patent No. 2,037,633 of April 14, 1936. This patent describes making the steel alternately anodic and cathodic with intermediate periods of straight chemical pickle. The patent requires temperatures to be kept below 100 deg. F. and recommends a bath of 15 per cent phosphoric acid. In an attempt to duplicate the conditions called for by this patent, a 15 per cent phosphoric acid bath was used at room temperature. Voltages of 6½ to 6¾ volts were used. Lead electrodes were used to take the place of the fixed alternate anodes and cathodes. Each piece of stainless steel was treated by being made the anode for 10 sec. then allowed to still pickle for 15 sec. then being made the cathode for 10 sec. then still pickling for 15 sec. more and then repeating this cycle four more times, making a total time of treatment as anode of 50 sec., as cathode of 50 sec. and as a still pickle of 75 sec.. This is a gross of 175 sec. or approximately 3 min.

Method No. 6: Leonard O. Larsen, United States patent No. 1,984,534 of Dec. 18, 1934. This patent describes a method of pickling non-ferrous metals using phosphoric acid to inhibit the formation of stains on work when exposed to air after dipping in the bath. It is not an electrolytic pickling process. It has been suggested that Larsen's bath consisting of a mixture of sulphuric, nitric and phosphoric acids used as a still pickle might give some indications of producing a polish on stainless steel without the use of electric current. Tests were, therefore, run with his preferred mixture of 50 per cent sulphuric acid, 36 per cent nitric acid, and 14 per cent phosphoric acid as a straight still pickle at room temperature for 5 min.

Method No. 7: Quintin Marino, British patent No. 305,036, Jan. 28, 1928. In accordance with the wording of this patent, a 15 deg. Bé sulphuric acid solution was prepared. To a specific volume of this solution was added the weight of calcium phosphate calculated to completely react with the sulphuric acid, the products

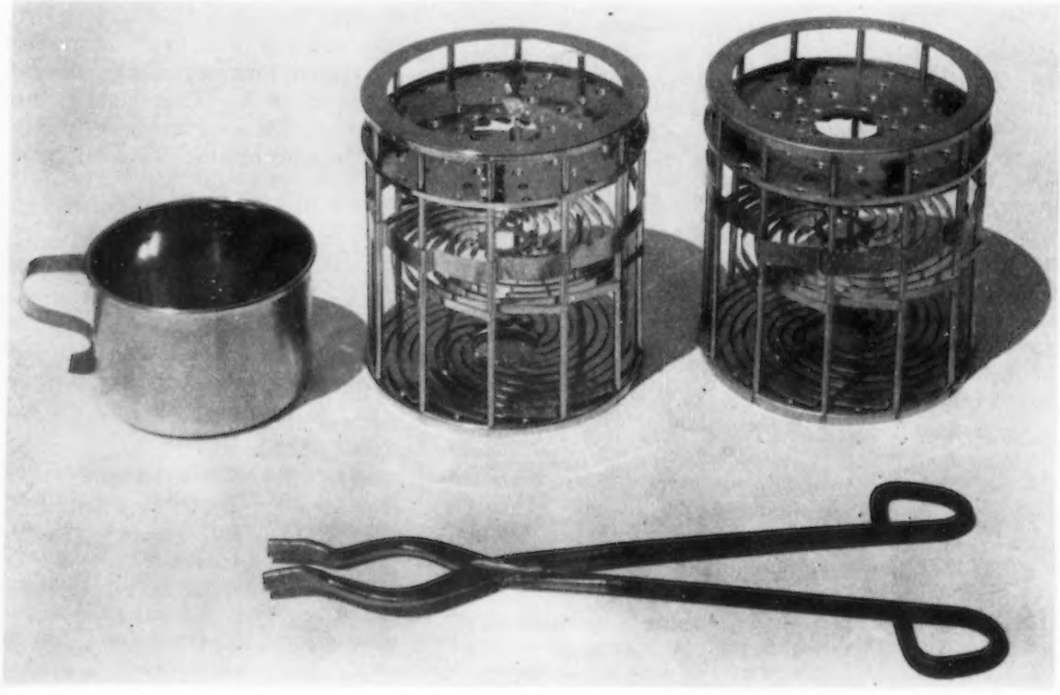


FIG. 2—Some samples of stainless steel articles finished by electropolishing, in this instance by the Blaut-Lang process.

FIG. 3 — These stainless steel articles have been electropolished by the Blaut-Lang process for demonstration.

being calcium sulphate and phosphoric acid. The reaction resulted in the formation of a heavy sludge, which after 24 hr. was removed from the solution by filtration. Anhydrous sodium sulphate was then added to the filtrate until no more would dissolve, thus indicating a saturated solution. Specimens were treated in the electrolyte prepared in the above manner. The specimens were made anode for 1½ min. and then made cathode for an equal length of time. A current density of 100 amp. per sq. ft. was used. The runs were made at room temperature.

Such a series of experiments shows some interesting results. Some of the processes clean the steel, and some apparently have polishing effect in varying amounts. Some etch certain types of steel and some polish, some polish 18-8 very well but have a far less satisfactory effect on straight-chromium grades, or vice-versa. This series of experiments can be duplicated in any laboratory.

Blaut-Lang Process

The original Blaut-Lang process covered by patent No. 2,115,005 is an anodic treatment in sulphuric and hydrofluoric acids for the purpose of descaling all types of stainless steel, of nickel-base alloys and of high-nickel silvers. It is also for electropolishing of stainless steels of the 18-8 variety and of the nickel-base alloys and high-nickel nickel-silvers. The Blaut-Lang processes which have been developed since and which are the subject of further patent applications are applicable to all types of stainless steel, to aluminum and many aluminum alloys, to nickel and monel metal, to plain carbon steels and a variety of other metals. In these processes, the base of the electrolyte used is phosphoric and sulphuric acids. The proportions and concentrations of acids, the temperatures of operation and the current densities vary according to the particular metal or alloy being treated. Special addition agents have been developed which enhance the electropolishing action of the mixture as applied to the different metals. Special procedures have been developed for controlling the solutions during operation so that they will continue to function satisfactorily and uniformly for long periods of time.

An installation for electropolishing by the Blaut-Lang processes consists of a lead-lined tank for holding the electrolyte and equipped with suitable heating and cooling coils to maintain temperature. The work is hung from copper racks designed to suit each particular job to be treated. Either copper or lead may be used as cathodes. Cathodes are placed as near to the work as possible in order to increase tank capacity and in order to reduce voltages required. Normal operations are carried out with 6 to 12-volt generators as used in ordinary electroplating practice. The length of time of treatment required for an article depends upon the initial condition of its surface, the kind of steel or alloy from which it was made, the shape of the article and the degree of polish desired. Average times run between 4 min. and 10 min. Current densities vary from 1 amp. per sq. in. to 5 amp. per sq. in., again depending upon the kind of material, its initial surface condition, the size and shape of the article and the type of finish desired.

Hundreds of sizes and shapes of articles have been treated by the Blaut-Lang processes. Experience gained from the results of this experimental and development work extending over a period of several years is available to each licensee operating under the process. Methods of controlling the solution and procedures for adjusting the solution from time to time as necessary have been developed and these are available to all licensees.

Photographs to show the degree of polish obtained on various articles and the great improvement in appearance of the article as the result of electropolishing technique are difficult to obtain. An attempt has been made to produce such photographs. A number of items so polished appear in Figs. 2 and 3. It is obviously impossible to attempt to include in this article a

photograph of each of the hundreds of different kinds, sizes and shapes of articles which have been and which are being treated regularly by the Blaut-Lang processes.

Small items, such as nuts, bolts, rivets, washers, nails, tacks, etc., made of stainless steel may be electropolished by newly developed barrel methods. No ordinary electroplating barrel is satisfactory for electropolishing due to the high current densities required and due to the further requirement that practically continuous current flow must be maintained on each article in the barrel. In normal barrel plating some of the articles are receiving plate at full current density while the balance of the articles are at very low current densities or are acting purely as conductors to other articles. In electropolishing, it is necessary that practically all of the articles in the bath receive current continuously. This presents a problem which has not been solved successfully in the electroplating field, but which seems to be well on its way to solution in the electropolishing field. Barrels have been built which will handle between 1000 and 2000 amp. and which will electropolish either on the basis of batches or on a continuous basis. The amount of material which is in the barrel at any one time must be such that the total exposed surface will be treated at a current density of from 1 to 4 amp. per sq. in. For barrel work, voltages of 12 to 16 volts are used.

After electropolishing whether by rack or barrel method the work is rinsed and washed. The electropolishing process in itself is a passivating one but it is necessary that the surfaces be properly cleaned of residual films or traces of salts which might promote corrosion. This is accomplished by thorough washing in hot water or by a suitable rinse followed by a thorough washing in hot water. When properly rinsed and thoroughly washed, the stainless steels have surfaces which seem to be satisfactorily passivated.

In the case of aluminum and aluminum alloys, the surfaces treated by the Blaut-Lang electropolishing process carry a thin film of aluminum oxide. The film thickness is not great but it has the ordinary properties of aluminum hydroxide films produced on aluminum by anodic treatment. The film is harder and more wear and abrasion resistant than the ordinary aluminum surface. The film provides resistance to corrosive attack, weathering, etc. of the aluminum.

In the case of nickel, monel and Inconel metals, the process has been applied to wire and strip in continuous treatment in the same way as it has been applied to stainless steel. It has been found that Z Nickel as well as ordinary nickel, monel and Inconel metal may be satisfactorily electropolished by these methods.

All in all, electropolishing represents a continuous advancement in the techniques of electrochemistry. It is an outgrowth of a search for better methods of cleaning and pickling of metals.

Electropolishing has widened the field of metal finishing, extending polished surfaces to places which previously were thought unreachable or economically unpolishable.

Though it promises to become a competitor of mechanical polishing, there are no indications as yet that mechanical polishing will be displaced. They both have their respective places in the field of metal finishing.

Arc Welding Neither Complicated Nor Difficult

ACCORDING to J. F. Lincoln, president, Lincoln Electric Co., Cleveland, arc welding has too many doctors. An operation which is perfectly natural, very simple and very easily accomplished, has largely been changed in the minds of the public to an art which takes on the mystery of voodooism with an admixture of the art of the medicine man.

The public is beginning to think that the welding operator is a cross between a miracle man and a professional musician. This opinion is groundless. The only thing that a welding operator can do is to hold the end of an electrode at a certain distance above the deposited metal and advance it along the seam to be welded at a certain speed. Nothing more is involved in this operation. It is neither complicated nor difficult. As a matter of fact, with proper electrode, proper setting of the welding machine and proper preparation of the work, it is practically impossible to make a weld which will not stand up in service without having it so evident to the inspector that he would immediately reject it. It is possible to have defects in the steel that cannot be seen which will make a steel structure dangerous. It is impossible, however, to make a weld on that structure which is dangerous without it being obvious to anyone looking at the weld.

The reason so much is heard about the necessity of skill and care in welding is largely due to the fact that the operation itself is so simple that it is difficult to find much about it to discuss in papers, lectures and statements. Therefore, many of these eccentricities which are volubly discussed in magazine articles, lectures and statements, consist of theoretical possibilities which exist only in the minds of the lecturers and seldom exist in reality.

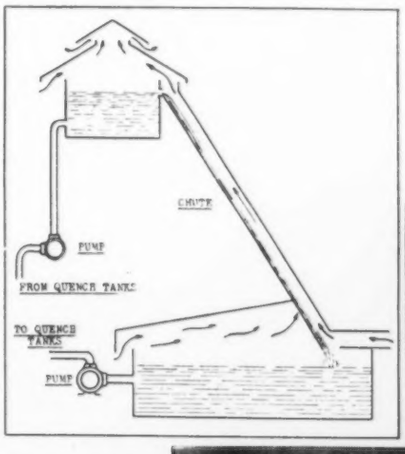
It is time to get away from trying to make this very simple operation mysterious, Mr. Lincoln states. It is time to recognize the fact that the metal deposited by the shielded arc electrode is definitely better than the parent metal it is joining. It is time to recognize that there has never been a failure on an insured pressure vessel made by the shielded arc process. It is time to recognize that in the usual design if only half a weld is made it will withstand all of the normal requirements of the structure. It is time to recognize that failures in welds which are made by the methods recommended by any reliable manufacturer never exist. It is time to recognize that there is no mystery in welding and that making a welded joint is far more simple than making a riveted joint and more simple than making the steel which is joined together by this process. It is time to recognize that to spend time, money and attention in removing the least possible flaw from the deposited metal is silly in the light of the obvious flaws which must occur in the parent metal. A factor of safety is used to guard against these flaws. That is more than is needed in any commercial weld.

When these facts are recognized two things will result: First, the green light will be given to one of the most economical processes now known for the production of many structures; secondly, there will have been removed one of the fears which the uninitiated have developed regarding a perfectly normal manufacturing operation.

COOLING SYSTEM FOR QUENCHING OIL

HEAT treating shops frequently find that the cooling of quenching oil in summer is a costly and troublesome affair. However, for the small shop, where sufficient work is oil quenched to require cooling of the oil, it is possible to use a quench tank and water cooling system. In such a cooling system, oil is pumped through a small tank containing a coil which is cooled by city water. The unit is compact and easy to build and parts for the cooling system can be purchased from sources specializing in that type of equipment. The same idea on a larger scale can, of course, be adapted to several quench tanks.

Where the quantity of oil to be cooled runs into thousands of gallons, water cooling is generally too expensive; for a large amount of water is required, and unless some other useful function can be found for the water it ordinarily goes directly to the drain.



SKETCH shows quenching oil cooling system. Note how air circulates freely in all three units. A system of this type now in operation is shown in the photograph.

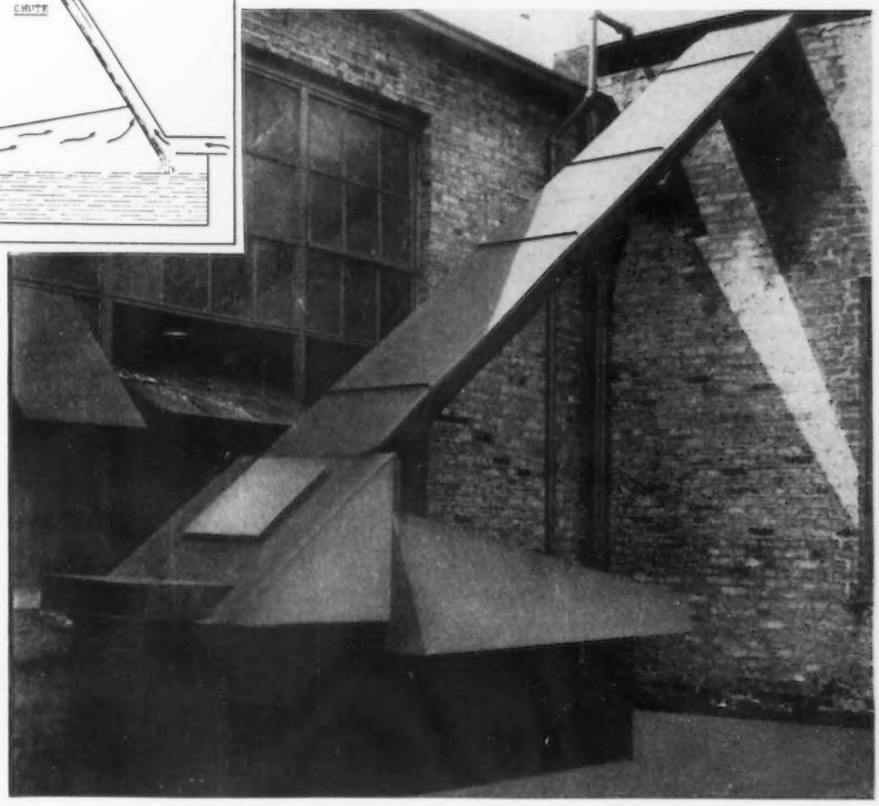
One system which the Lindberg Engineering Co., Chicago, has found to do a good job of keeping large quantities of oil cool is illustrated in the accompanying sketch and photograph. In this system the hot oil leaves the quench tanks and is pumped to a reservoir tank on the roof of the building. Here it overflows down a sheet metal chute where it cools and goes into a second reservoir at ground level from which it is pumped back to the quench tanks. The whole operation is, of course, continuous.

Approximately 9000 gal. of oil are contained in the complete system, and during the three years it has been in operation the company has been able to maintain oil temperatures at 140 deg. F. to 150 deg. F. on the hottest summer days. The system, incidentally, is patterned after a similar one at the Vincent Steel Process Co., Detroit, and has proved thoroughly dependable as witnessed by the fact that it has never been out of service even for a single hour due to trouble.

As indicated in the sketch and photograph all three units in the cooling system—the roof tank, chute, and storage tank—are provided with hoods and air circulates freely in them. Dimensions of the chute are approximately 6 in. deep by 24 in. wide by 24 ft. long, and circulation of air here is of considerable importance. Of particular importance also is the coarse wire mesh screen (approximately 1x1 in. openings which is laid in the chute and over which the oil must pass. This screen breaks up the flow of oil into ripples and permits more rapid heat transfer to the air than a solid stream.

The hoods or covers are designed so that no rain or snow finds access to the system, and yet air can freely enter and leave. This same system can be readily adapted to smaller or larger installations and because of its simplicity, can be constructed for a reasonable sum.

The complete system used by Lindberg, exclusive of quench tanks which were already installed, cost the company approximately $500. Smaller systems would, of course, cost less. The operating cost is very low, as it consists mainly of electric power to run the two pumps in the system.



Progress Rides the

RESOLVED: The International Revenue Bureau should encourage the highest supportable depreciation rates for income tax purposes

THE field examiner from the Income Tax office was still removing his top coat when the taxpaying machinery manufacturer's blood was chilled by the official Voice of the Government booming, "Your depreciation is too high! You'll have to lower your rates."

Of course, it never happened exactly like that but the result is the same and progress toward great employment, toward higher living standards, toward increased Government revenue is slowed down. In other words, business has a brake applied to its progress and the whole nation suffers.

Postpone, for the moment, any discussion of the harmful effects of the Government policy of constantly pressing for lower rates, and consider the idea that the Voice of the examiner can be so potent. Ye Gods! on what meat has this man fed? Or is it that the taxpayer, worn down by forms, questionnaires, regulations, laws and threats of more of each, has become vulnerable?

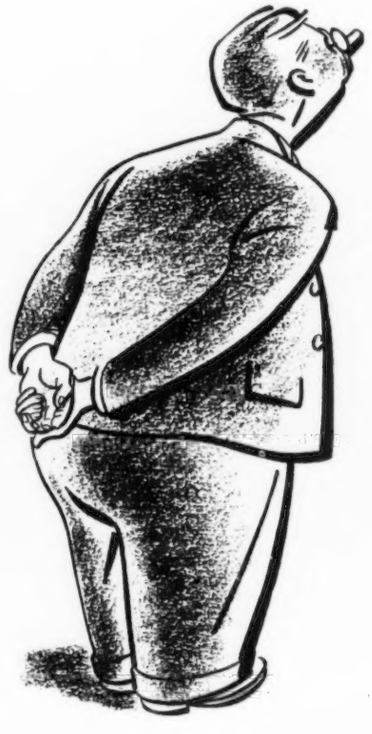
If the taxpayer's father built machinery before the advent of income taxes he undoubtedly took pride in the speed with which he could write off the cost of the facilities he acquired to fill his contracts. And, he was recognized as a good business man and a good credit risk for such ability. Then came income tax forms, regulations and laws nurturing an ever expanding crop of examiners, lawyers, accountants, appraisers and other forms of experts. The manufacturer didn't see how this crew of professional scorekeepers were going to lower his production costs and paid little attention to the precedents that were thereafter established.

Charge the manufacturer with an error, for from the beginning of the application of the income tax onward the taxpayer has had less and less opportunity to freely exercise his judgment regarding the real value of his productive facilities. And, as the subject is explored today, it is found that there is a new generation of manufacturers which never has had the training to recognize the need for a factual appraisal of the real worth of equipment and products. The greatly reinforced army of professional scorers has had voluminous evidence with regard to capital accounts and the depreciation thereof incorporated into legal decisions, regulations, formulas, and such, all interpretable only to the score card, commonly known as the balance sheet. Even bankers, to whom the manufacturer occasionally needs confess his errors, too frequently accept the values on the audited balance sheet as the true worth of the manufacturer's investment in capital equipment. So, while the scorekeepers make obeisance to that golden calf, "book value," the realistic manufacturer, like Longfellow's boy, enjoys the solitude of the burning deck.

Ingenuity Isn't Dead

Can he get off the deck before he burns? Surely, he comes from that breed of pioneers who have developed new methods, new products and new processes as a means of providing his own food and keep. The manufacturer can and does ignore the golden calf, "book value," when conducting his endless search for time saving, material saving mechanisms. He must, for his very successes make obsolete the more expensive processes which free competition forces him to displace. With the abandonment of superseded mechanisms comes tax savings that compensate for the low depreciation rate that was allowed on his prior tax returns, so why should he debate the question? Why? For his customer's sake and for the sake of himself and of his successors.

The Government policy of reducing



Coat-Tails of Obsolesence

By EUGENE C. CLARKE
Chambersburg Engineering Co., Chambersburg, Pa.

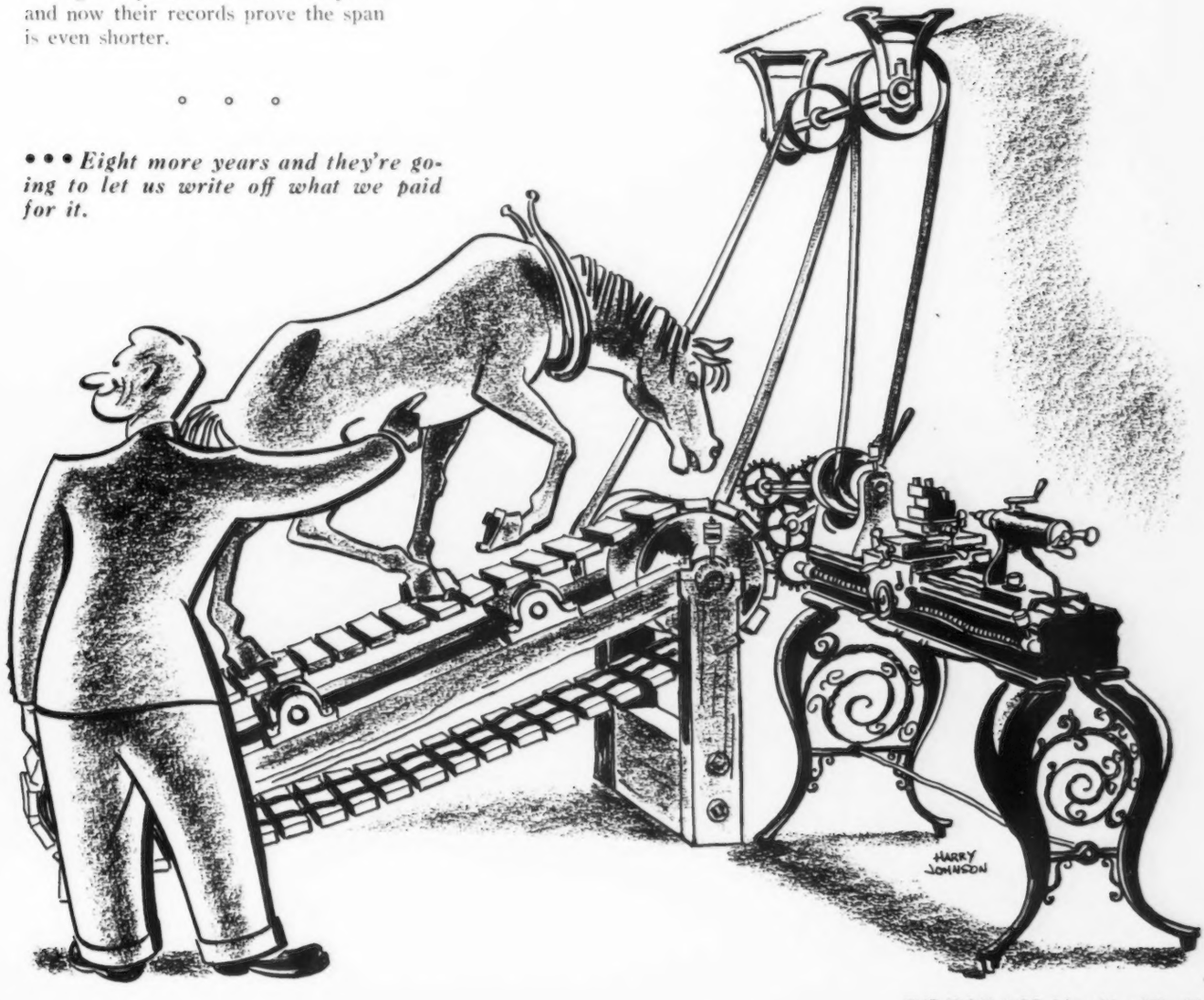
allowable depreciation charges for tax purposes, in Canute's language, says, "Progress, cease!" The policy ignores ingenuity of myriads of minds, which ingenuity ceaselessly destroys the worth of capital invested in facilities by outmoding the need for the facility. But, that Government policy is accepted by too many manufacturers is evidenced by the short and shortening life of corporations in this country. Dun & Bradstreet used to say that the average corporate life was five years and now their records prove the span is even shorter.

o o o

If the manufacturer whose intimate contact with the destruction of real value of facilities is failing to protect his capital by the proper recovery of cost of these facilities in his processes and prices to the extent indicated by the mortality rate, can it be expected that others will question the Government theory? No, certainly not—and it is found that the investor, the lawmaker, the sociologist, in fact practically all groups, are heeding the Voice of the field examiner, who by now has removed his coat and taken over an

o o o

• • • Eight more years and they're going to let us write off what we paid for it.



important part of the taxpayer's thinking processes.

Verily, the Voice of the examiner is potent.

How does this Voice slow down progress toward greater employment, higher living standards and increased Government revenue? These three objectives are intimately linked to the supplying of more goods and services to more people and merit realistic consideration in relation to the destruction, by obsolescence, of capital goods.

New goods, processes and services create new jobs much faster than would be demanded if the dependence was solely on population growth to provide occupational expansion. A moment's consideration of new products of the past quarter century and the numbers working at supplying those products is all that is necessary to conclude that new things provide the most of new employment. Inexpensive automobiles, airplanes, radios, refrigeration, sound movies now blossoming in color, printing processes, paper, textiles, oil—hours can be spent cataloging the new things and new jobs.

It is notable, however, that most of these things were conceived before the Voice of the field examiner began to express the theory that capital goods enjoyed a long span of useful existence. It is obvious that the long list of new jobs is necessarily complemented by a long list of new facilities. Did the reader ever crank a car or light gas headlamps? Would he do it today? Can the reader imagine foregoing the polishing, burnishing and inspection that his car gets when he stops to fill 'er up, having instead to go, if the horseless carriage would make it, to the local grocer's tank and wait for him to hand-pump some naphtha into a can and thence to the tank. And what of the road traveled to get there? New occupations and new jobs have been created in road building just as in every other new activity. And the value of the priorly employed capital equipment was destroyed in providing these improvements just as surely as some old jobs were destroyed. The blacksmith, harness maker, type setter and their like lost the investment represented by their skill, but, so also the worth of the capital facilities for making buggies, water troughs for Betsy, gas lamps and starting cranks was destroyed. The Voice of the examiner is falsely telling the world that capital goods are less destructible than occupations and 'tis sad that much of the world believes it. As this belief is translated into slow motion replacement of production facilities there follows a deceleration in the expansion of working opportunities.

There also is generated irregular peaks and valleys in the orderly production of capital goods and employment of workers. If the Voice of the examiner is heeded, capital destroyed in productive enterprise is not recovered at a time which provides for orderly replacement. Concerns which vary their recoveries with their activity have most funds when they are busy. This activity usually coincides with a general activity, hence demands for capital reach highest peaks with greatest general business activity and sink to seemingly bottomless depths when the business chart slides, even coasts, downward. It is obvious that the cost of capital goods is increased by these cycles, and, therefore, the cost of creating new jobs is upped, and the provision of new jobs is discouraged. And in the unbalancing group are found those manufacturers who accept the examiner's contention that their facilities are hardly depreciating at all.

Premium on Inefficiency

If the examiner were instructed to reverse his aims and to err, if at all, on the side of too rapid accumulation of reserves for depreciation his Voice would just as potently guard jobs and create new ones by assisting in preserving the liquidity of capital for reinvestment in the newer capital goods necessary for new jobs. The manufacturer would be only too glad to help him get his coat off when he came and try to prolong his visit.

How would this revolutionary ap-

• • • The Government man said we have to keep them on but they dasn't discover anything new.

proach to tax collection improve standards of living? Easily, for it would remove the premium on the use of inefficient, laborious processes. With no intention of debating as to whether necessity or laziness is the mother of invention, attention is called to the fact that most new things and processes reduce the amount of labor necessary to accomplish any given task. The conservation of human energy expended at labor and the release of that energy for other pursuits is basic in attaining higher living standards.

Individually, higher standards of living are realized in more continuous and more profitable employment providing means of acquiring, for personal use, the better living quarters, transportation, amusements and funds of knowledge which are competitively seeking buyers. There is no denying that any collective public body ever contributed more than the right to pioneer in the development of the marvels at its command. The enlightened Post Office turned down the telegraph; the patent office once decided (1886) that all new ideas were completed, and recently many prominent public employees have brazenly flirted with the same idea.

No—the prediction is made that if the Voice were to goad the manufacturer's natural annoyance with even the lightest tasks and urge the finding of a better way, a new surge will expedite the upward march of living standards and spread the benefits to an ever increasing number of people.

The Voice of the examiner, somewhat softer by now, inquires as to his own compensation and that of his employer, the Government, calling attention to the reduction of taxes due to increased deductions for depreciation. Very proper questions, these, and they suggest two answers.

First, does not the Government penalize itself by the very replacement policy it urges? Assume (for the moment with a promise of further discussion), that capital goods are destroyed more rapidly than the allowed rates of depreciation indicate. None will deny the existence of peaks and valleys of both business activity and demand for capital goods which conclusively demonstrate that facilities are acquired almost exclusively at the peaks of prosperity. Coincidentally, facilities are being abandoned at these same peaks, and the taxpayer may be trusted to get full credit for the residual book value of the displaced goods. With graduated taxes in effect it pays best to abandon goods in the taxable period of greatest profit. Government tax receipts are thus reduced by the present procedure.

Second, since time began newly recognized things, processes and services have been creating new jobs and more jobs. Advantage can be taken of these new forms of wealth and social progress only as the use of outmoded forms is abandoned. The rate of replacement of processing and productive facilities is expedited as invention and research is speeded to useful conclusions. Research is so rapid that each day finds industry knowing less and less about more and more. To make the new products now known available will require more dollars than can be secured from depreciation reserves, and idle capital will find employment along with the increased numbers at work.

This can be done if the Voice be instructed to change its tune.

Now consider the rate of destruction of capital goods.

Talk, testimony and temporizing offers the "mature corporation" capable of living off its reserves for all time to come as the ultimate of man's cooperative effort in organized business. With profound respect for the authors of this idea it is necessary that their attention be called to fallacies embedded in their conclusions.

Start with fundamentals. A craftsman can produce no more than his tools permit. The better his tools the greater his production and, in a free competitive society, the lower sales price he can set. Thus other persons can buy his product. As competitive products or processes threaten his clientele, the craftsman needs still better, more efficient tools.

Better tools cost more money because the only consideration that makes them better to the craftsman is that the better tool accomplishes more of a process in less time, with less raw material, with less power or a combination of two or more of these or similar attributes. Therefore, to be acceptable to the craftsman as a better tool the new facility needs be more than a reproduction of the existing device; it needs be more nearly automatic in the service it performs. This requires greater speed, greater power, more rigidity, more precision, or combinations of these and other characteristics.

Such improved tools require more material and more time in their construction, backed by essential research and tests. These components make the better tool, with practically no exception, more expensive than its predecessor. Supporting evidence can be had from any tool builder who has produced better tools for a longer time than the average span of years heretofore mentioned, or from the publications of the Ford Motor Co., whose investments in better tools have been continuously increased and whose products have been consistently marketed at lower prices. Such better tools are representative of the capital goods class of durable goods and are used in the production of things destined to serve the ultimate consumer. By being better they promote wider use through lowered costs and prices. The demand for better tools comes from industry when it is expanding its production, mainly through lower prices.

If a "mature industry" be identified as one which is approaching obsolescence, it is admitted that it will not demand better tools. One would be inclined to question further, should not such an industry return its recaptured capital to its shareholders? If the management cannot envision the changes that will occur in the near future, perhaps the individual shareholders could find other occupation for their funds.

There is abundant evidence in every direction that obsolescence will continue and that the velocity of such obsolescence will increase.

Should the Voice of the examiner be the croaking, hoarse threat of defeatism or the vigorous, confident spur to more goods and better goods for more and greater people?

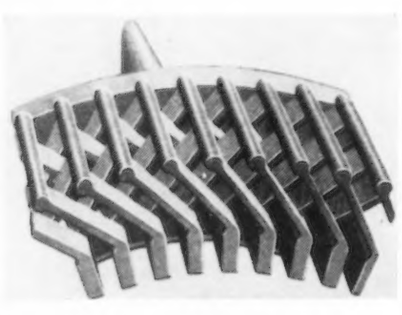
WHAT'S NEW IN MOTORS

By FRANK J. OLIVER
Associate Editor, The Iron Age

o o o

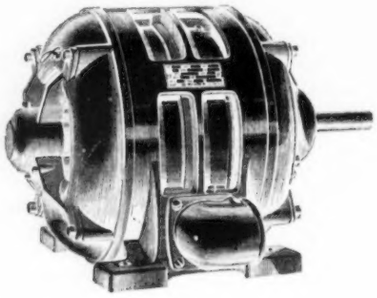
OVERALL characteristics superior to those which can be obtained from conventional Boucherot double squirrel cage rotors are claimed for the new Valv-Amp cast aluminum double squirrel cage rotors developed by *General Electric Co.* for high starting torque, low starting current service. The design makes use of a unique shape of rotor slot and a special method of assembling rotor punchings to control the flow of starting current. A winding of this new construction may be of various arrangements and is unique in that the neck that connects the inner and outer cages is substantially discontinuous longitudinally through the rotor. In the arrangement illustrated in the phantom view of the conductor bars (without the silicon steel laminations in place) the neck is oblique rather than radial, and by a special stacking of punchings during assembly, the axial continuity of this connecting neck is broken up.

This arrangement forms a magnetic switch or valve. At starting, when the frequency of the rotor current is high, this valve magnetically is closed and no current flows through this connecting neck. As the motor comes up to speed and the frequency of the rotor current decreases, the magnetic valve opens and current flows in this section. Motors have been built in which 50 per cent of the total slot section is in the connecting link, giving superior operating characteristics. The design also permits extending upward the range of ratings of high starting torque, low starting current motors with cast rotors, bringing for the first time, it is said, to the larger sizes of type KG motors the permanent electrical characteristics, simplicity of construction, low maintenance and long life of the cast rotor.



Low Ampere Starting Motor

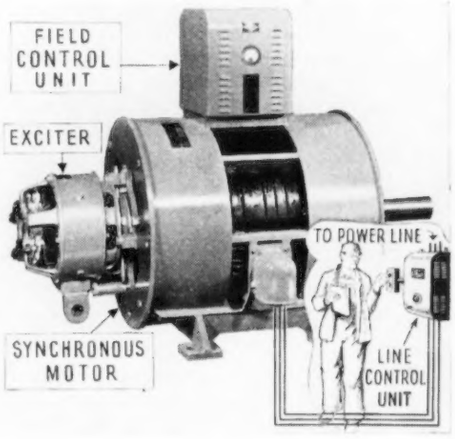
THE *Louis Allis Co.*, Milwaukee, has announced a new Lo-Amp electric motor which has low locked-rotor current and can be supplied with either high starting torque or normal starting torque. The motor features the rugged simplicity of the standard squirrel cage motor and does not employ any brushes, slip rings or centrifugal switches, nor does it require multistep starters for control. Curves 1 and 2 on the accompanying chart show the inrush current and starting torque for a 50-hp., 1800 r.p.m. Lo-Amp motor as compared with the corresponding data shown in curves 3 and 4 for a standard double deck squirrel cage motor of equal rating. The characteristics of this Lo-Amp motor are said to make it particularly well adapted for refrigerating and air conditioning applications.



Self-Contained Synchronous Motor

A NEW high-speed synchronous motor of "packaged" construction has recently been developed by *Electric Machinery Mfg. Co.*, Minneapolis. The self-contained design simplifies installation and wiring, reduces space requirements, and lowers first cost. Wiring on the job is the same as for a squirrel-cage induction motor and need for a separate, panel-type control has been eliminated.

The motor consists of: (1) a fabricated, all-steel motor of compact design, (2) an exciter, mounted on top of and V-belt driven by the motor, or direct-connected to it, and (3) a field-control unit, mounted on the motor, for automatically applying and removing excitation for the field winding of the motor. The line control unit can be an ordinary across-the-line or compensator type induction motor starter. These high-speed packaged synchronous motors are available up to 350 hp. at 1800 r.p.m. The 50-hp., 1200 r.p.m. size is illustrated.

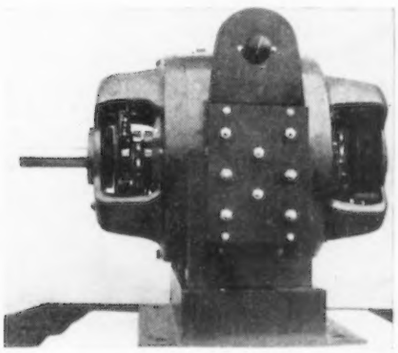


Combined D.C. Motor and Converter

FOR manufacturers located in d.c. powered areas, the *Kato Engineering Co.*, Mankato, Minn., has designed a line of d.c. motors which in addition to driving a piece of machinery also furnish 60-cycle a.c. current for the operation of an a.c. auxiliary function, such as the operation of relays and controls, synchronous motors as used in time cycle equipment and the operation of fluorescent lamps. One interesting application of the Kato special d.c. motor is on the Doall contour

AND CONTROLLERS

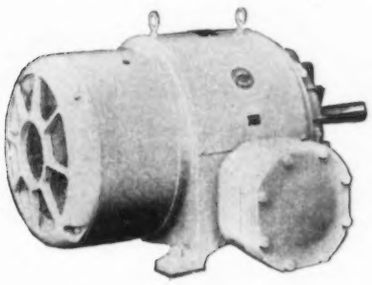
sawing machine, manufactured by *Continental Machines, Inc.*, Minneapolis. To facilitate threading the saw through an internal job, it is necessary to break the band, insert one end through a starting hole and then butt



weld the two ends together. When this machine is supplied to users in d.c. areas, it is equipped with a Katolight d.c. main drive motor with a.c. take off for operation of the transformer of the built-in butt welder.

Large Size Explosion Proof Motors

HIGHER horsepower explosion proof motors are now being offered by *U. S. Electrical Motors, Inc.*, of Los Angeles and 80 34th Street, Brooklyn. In class I, group D motors, the ratings have been increased from 25 to 75 hp., while in class II, group G, they have been increased from 7½ to 75 hp. The larger motors are of the shell type frame construction and have a specially designed fan, said to be quiet even at high speeds. Wiring is made more convenient with a larger terminal box. The fan-end inner end-



DEVELOPMENT of a new form of cast rotor brings new operating characteristics to double squirrel cage motors for high starting torque, low starting current service. Electronic rectifiers are being offered for d.c. auxilliary service on machine tools. A great many new controller designs have been placed on the market in the last few months, as well as new controller elements.

o o o

bell and the outer fan cover bracket are held in place with a simplified combination screw, eliminating one set of holding screws and supplying a rigid mounting for the fan cover and bracket, besides facilitating assembly and disassembly of the motor.

U. S. Electrical Motors has also developed an oil lubrication system which is now supplied on all open type SA and Uniclosed type SC motors larger than 30 hp., 3600 r.p.m. and 75 hp., 1800 r.p.m. A conveniently located oil gage, marked with maximum and minimum level, is supplied on all oil lubricated ball bearing motors. The oil level is maintained just slightly over the outer race of the bearing. Constant level oil reservoirs are being furnished on the larger sizes of explosion proof motors as well.

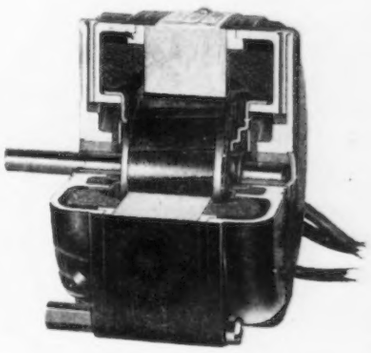
Resilient Brush Mounting

TO offset the injurious effects of vibration on carbon brushes, *National Carbon Co., Inc.* is supplying brushes with a resilient pressure pad secured to the holder end at the point

of contact with the pressure finger. Where vibration of great severity is encountered the use of these pads materially reduces such destructive effects as chipping and cracking of brushes, wear on the holder end of the brush and wear of the pressure finger tip. Within the range of temperature normally encountered on electrical equipment the pad will retain its resiliency throughout the life of the brush.

Small Synchronous Motor

A SMALL type K synchronous motor of 8-watt input has been designed by the *Bodine Electric Co.*, 2254 W. Ohio Street, Chicago, for

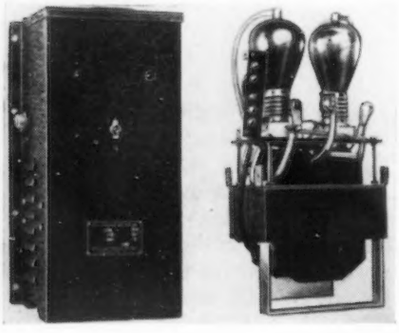


continuous duty in driving such devices as industrial controllers, instruments, timers and similar applications. The windings will withstand stalling indefinitely. Designed as a capacitor motor, it can be supplied with three different windings: synchronous capacitor, nonsynchronous capacitor and dynamic braking capacitor. Standard ratings on 60 cycles are 1/1500 hp. at 1800 r.p.m., 1/1000 hp. at 1700 r.p.m. and 1/1500 hp. at 1200 r.p.m. The motor is 2⅜ in. wide and high, and 1⅝ in. in length, excluding the shaft extension. Operation is at 110 volts. Sleeve bearings are standard, ball bearings optional.

Electronic Rectifier

A LOW priced means of converting a.c. into d.c. for operating five or six toolroom magnetic chucks or other

d.c. equipment is provided by the model CR-6 rectifier built by the *Mellaphone Corp.*, Rochester, N. Y. Compact in size, this rectifier has a d.c. output of 660 watts (¾ hp.). It will withstand 100 per cent overload for 5 min., thus making it a suitable source of d.c.



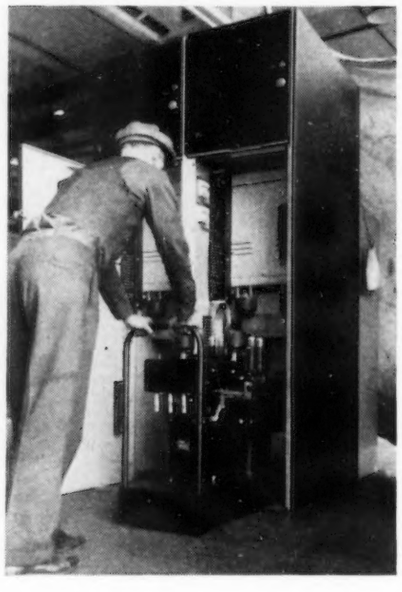
where starting current is high. In the unit, two mercury vapor tubes are used to rectify the full wave of the single phase a.c. line current. Internal construction is such as to prevent sagging of the filaments, thus extending tube life. An on-off switch is provided and red and green pilot lamps indicate when the current is on.

Portable Rectifiers

EFFICIENCIES of 90 per cent on full power and no-load losses of only 60 watts in some sizes are claimed for a new line of Porto-Rect portable commercial rectifiers offered by *Cassels Engineering & Machine Co.*, Box 114, Wauwatosa, Wis. These rectifiers use the latest type of hot cathode mercury arc tubes. In its simplest form, the Porto-Rect unit consists of a bank of tubes and an auto or isolating transformer. To this basic design can be added voltmeters and ammeters in conjunction with suitable controls for positive current adjustment or variable voltage controls can be furnished. Although most units are built to suit the particular application, the company is prepared to furnish these units for use on 110 or 220-volt single phase circuits, with 115 or 230 volts, 12 to 90 amp. d.c. output, and for 110, 220 or 440 polyphase circuits with 115, 230 or 550 volts and any amperage output. Such units can be built into machine tools for operating magnetic chucks and adjustable speed d.c. motors.

Metal-Clad Switchgear

SEVERAL design improvements on type MI-9 metal-clad switchgear have been announced by the *General Electric Co.*, coincident with a material price reduction. The main bus is covered with a molded insulation of high dielectric strength and all bus connections are covered with molded covers filled with compound. Type MI-9 uses a circuit breaker employing the oil blast principle of circuit interruption. The primary disconnecting devices are of the stud and socket type, with silver to silver, high pressure line contacts. A screw jack mechanism raises or lowers the breaker onto a transfer truck as shown for servicing. Secondary disconnecting devices automatically connect or disconnect all the secondary connections when the breaker is raised or lowered, but mechanical interlocks prevent disconnecting or reconnecting the breaker, while it is closed. MI-9 switchgear is available for the protection of circuits up to 5000 volts and 50,000 kva.

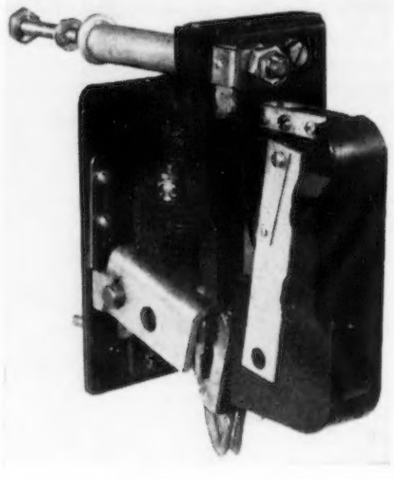


Heavy Duty Motor Controls

TWO new features in the design of contactors for heavy mill duty are found in the 540 line of d.c. heavy duty contactors furnished in 100, 150, 300, 600, 1200 and 1800 amp. sizes by *Cutler-Hammer, Inc.*, Milwaukee. A high efficiency arc blow-out quickly drives the arc from the contacts to the large horns above them, thus prolonging contact life. Heavy duty arc shields with carbofrax inserts opposite the contact tips lift off for inspection as shown in the photograph. The second feature is in the design of the electric interlock. Contact troubles are said to be eliminated by the C-H dust-safe, vertical contact construction used in other types of C-H motor controls. Contacts are pure silver, and the actuating rollers are made of long wearing bakelite.

D.C. Industrial Contactors

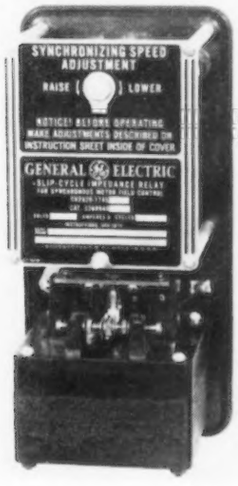
IMPROVED heavy duty d.c. magnetic contactors, designated as series 200, type SM, have been announced by the *Westinghouse Electric & Mfg. Co.*, East Pittsburgh, Pa. The armature overtravel of the contactor is increased, contact tips are larger, and nitrided bearings employed. The wearing depth of the contacts on all magnet closed contactors is also increased, thus prolonging the life of the tips. Heat is more efficiently conducted away from the contact surface by the enlarged mass of copper. Bearing pin



holes of the armature bracket are reamed so that all "play" is reduced and centering is assured. Larger operating coils on magnet closed contactors provide increased pull with increased reliability.

Synchronous Motor Control

ACCURATE control of synchronizing speed, so that the field cannot be applied until the motor has reached a speed at which it can synchronize its load is given by a new synchronous motor control featuring the slip-cycle impedance relay developed by *General Electric*. This speed is easily set on a trial start by an adjusting screw on the front of the relay. The control waits until the motor reaches the correct speed, then se-



lects an instant of favorable angular relation of stator and rotor poles to apply field current in order to take advantage of the inherent synchronizing ability of the motor. Protection of the squirrel cage winding during starting and the stator winding during running is provided by separate relays. Magnetic or semi-magnetic forms of this system of field application are available for full voltage, reduced voltage or part winding starting.

Non-Inflammable Transformers

ALLIS-CHALMERS transformers for all classes of service are now available with the new non-inflammable insulating liquid, Chlorextol. They have the same electrical characteristics as equivalent ratings of oil insulated types. Chlorextol transformers can be installed indoors at the load centers, without the necessity of using fireproof vaults, thereby saving space, since they can be installed in the open—on steel beams above floor level, for example. By installing a number of small transformers at load centers, short leads may be run directly to the loads, thus cutting down on heavy cable cost.

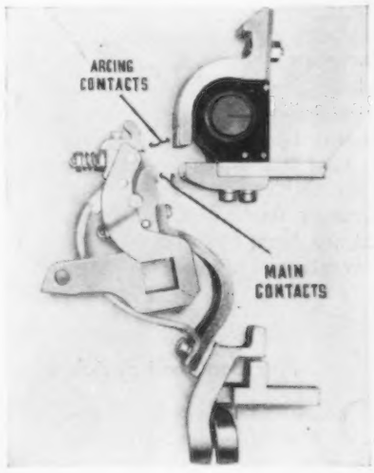
Plugging Switch

IN a new plugging switch for controlling motor stopping by reversing the power connections use is made by *General Electric Co.* of an Alnico magnet to remove the plugging power before reversal of rotation can take

place. In the operation of this switch, an Alnico rotor driven off the motor shaft produces a rotating magnetic field which induces eddy currents in the walls of an aluminum cup. The magnetic reaction thus set up turns the cup through its limited rotation, the torque depending upon the motor speed, and the contacts are operated by the Textolite rod which connects the cup and the movable contact strip. Centering springs tend to return the contacts to the normal position when the torque, which is a function of rotor speed, drops. The tripping point is adjustable by interchanging springs.

Contact Made from Powdered Metal

A NEW contact structure, employing Gibsiloy Grade A-3 on the main contacts, has been developed by the *I-T-E Circuit Breaker Co.*, Philadelphia, for its new type KB circuit breakers. The main contacts, shown in the illustration, consist of silver-nickel blocks electrically brazed to heavy copper bars. These contacts were supplied by the *Gibson Electric Co.*, 525 Boulevard of the Allies, Pittsburgh, manufacturer of Gibsiloy ductile contacts from powdered metals. Gibsiloy grade A-3 (85 per cent silver and 15 per cent nickel) was specified for the type KB circuit breaker because of its low contact resistance and high conductivity over a long period of time, resulting in minimum temperature rise under overloads. In addition, Gibsiloy has high resistance to wear. Because of its high ductility,



Gibsiloy can be furnished in a wide variety of shapes for practically any contact design. It is made in many grades.

Across-the-Line Starter

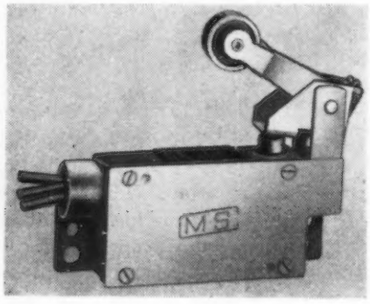
IMPROVEMENTS in bulletin 9586 across-the-line starter made by *Cutler-Hammer, Inc.*, Milwaukee, include a new "streamlined" hook-on cover, held by one fastening screw; interior of the case finished in light aluminum for better vision in wiring; holding of operating mechanism by one screw for accessibility; "dust safe" vertical contacts made of much heavier "fine" silver; "drop of solder" overload relay made smaller in size and with better operating characteristics. Lava insulators protect contact springs against heat transmission, and the springs and contact supports are made of stainless steel. This size 1 starter is made in a number of types of cover control and in a number of types of enclosures.

Combination of an across-the-line

starter with a motor disconnect switch is found in the newly developed *Cutler-Hammer* bulletin 9589 switch for use with squirrel cage and single phase motors. The front operated, contactor type disconnect switch incorporates dust safe vertical contacts which are interchangeable with the starter contacts. Overload protection is provided by a thermal overload relay, and the disconnect switch is also fused. This starter is available with either three or four poles, in five sizes with ratings from 6½ to 200 hp., and with several types of cover control.

Precision Limit Switch

OPERATING point is held within plus or minus 0.002 in. with relation to the mounting dowels, thus assuring interchangeability in the new LK-2 precision switch announced by

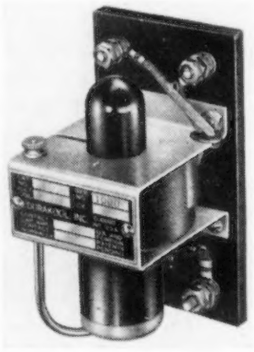


the *Micro Switch Corp.*, Freeport, Ill. Movement differential at the roller actuator is 0.002 in., with a pretravel of 1 deg. and overtravel of 20 deg. Actuator is adjustable through an arc of 225 deg. Operation pressure is 1.8 lb. or less. The switching element contained in the oil and water tight steel case is a single pole micro switch with normally open, normally closed, double throw contact arrangements. Rated at ½ hp. up to 460 volts a.c.

CUTLER-HAMMER has also announced a modification in the construction of its type MB Multi-Breaker assemblies. The device now is furnished with an insulated neutral which may be grounded if desired simply by inserting a screw in a tapped hole of the neutral, thus combining the design of the insulated and the grounded neutral. These assemblies are available with from one to 16 breakers which can be arranged for two or three-pole neutral circuits for a.c. service. The type MB breakers are made in either flush or surface mounting models.

Unbreakable Mercury Relay

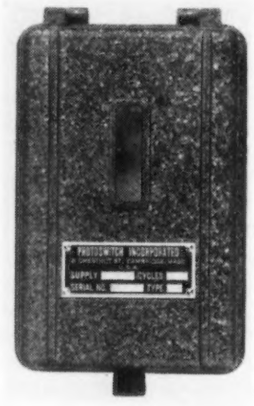
THE unbreakable metal body of the Durakool mercury switch is incorporated in a solenoid actuated relay, announced by *Durakool, Inc.*, Elkhart, Ind. The relay may be operated up to 300 times per min., and there is little friction and no wear in operation. The metal body is especially



treated to hold gas at a pressure of four atmospheres. Contact resistance is as low as 0.002 ohms. On a.c. current 1 watt is required for normal closing operation and 1.5 watts for opening. Manufactured to meet ordinary requirements, it is also available for special requirements up to 200 amp. capacity.

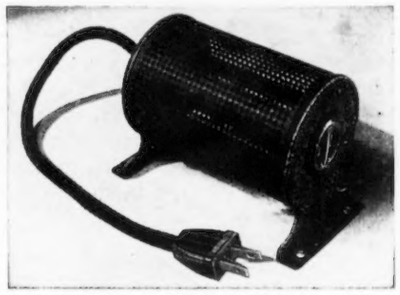
Electronic Pilot Relay

IN the new Photoswitch electronic pilot relay, control is effected by the delicate touching of two fine wires or contacts, or by their being short circuited by a liquid or even any moist material. Thus, large currents can be controlled by delicate mechanism, liquids or extremely light contact pressure normally not capable of being used to control electrical currents. Only three millionths of an ampere flows through the relay. This pilot relay is said to give indefinite life to delicate contacts on meter relays, sensitive temperature controls, electrical recording apparatus, precision electrical gages, flow meters, etc. It can be used to monitor automatic feed punch presses and machine tools. It is offered by *Photoswitch, Inc.*, 21 Chestnut Street, Cambridge, Mass.



General Utility Resistor

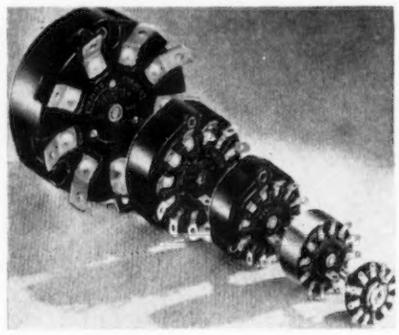
A LINE of general utility, voltage dropping resistors is announced by *Clarostat Mfg. Co., Inc.*, 285 N. Sixth Street, Brooklyn. Series HT units, available in any resistance and



wattage rating from 100 watts up, can be used for any voltage dropping or current regulating purpose. A Clarostat Greenohm power resistor is the heart of this device. The 100-watt size is housed in a 3-in. diameter perforated metal shell 4½ in. long, finished in high-temperature baked-enamel.

Power Tap Switches

NEW increased ratings have been set for each of the five Ohmite high current tap switch models. Model 111 is now rated at 10 amp., 150 volts; model 212 at 15 amp., 150 volts; model 312 at 25 amp., 300 volts; model 412 at 50 amp., 300 volts, and model 608



at 100 amp., 300 volts, all a.c. at any power factor. These high current tap switches are multi-point, load break, non-shorting, single pole rotary selectors of compact, ceramic construction. They can easily be connected in tandem to form multi-pole assemblies. They have slow break, quick make action especially designed for alternating current use. These switches are made by the *Ohmite Mfg. Co.*, 4835 Flourney Street, Chicago.

PROFILES

NEEDN'T BE STREAMLINED TO SPEED UP PRODUCTION!

TYPICAL TIME-SAVING PROFILES

(¼ ACTUAL SIZE)

- Section for Ornamental Tray Handle
- Section for padlock body
- Section Used for Manufacture of Embossing Dies
- Furniture Trim
- Aluminum Belt Moulding
- Section for Lock Bolt
- Section for forging into faucet handles
- Extruded and Drawn Naval Brass Section

REVERE Industrial Extruded Shapes offer nearly every industry an opportunity to speed up production and cut down costs. The great range of forms that can be handled is indicated by the few cross-sections above. Larger and more complicated Extruded Shapes could also have been shown.

Extruded Shapes are made by forcing metal, previously heated to a semi-plastic state, through a die of the profile desired. These Extruded Shapes in many cases can take the place of simple forgings, sand or die castings with a material saving in time costs, tool costs, metal costs and finishing costs.

If there is any metal part of your product that has a constant cross-section, we are sure it will pay you to investigate Revere Industrial Extruded Shapes. Just send us a sample or a fully dimensioned sketch.

REVERE COPPER AND BRASS INCORPORATED

230 PARK AVENUE, NEW YORK, N. Y.

MILLS: BALTIMORE, MD. • TAUNTON, MASS. • NEW BEDFORD, MASS. • ROME, N. Y. • DETROIT, MICH. • CHICAGO, ILL. • SALES OFFICES IN PRINCIPAL CITIES

On The Assembly Line

BY W. F. SHERMAN
Detroit Editor

· Months mobilization of planning put Detroit in shape to handle defense orders. War news dulls interest in next year's models. Steel orders reported tapering off. July auto schedules may be halved.

DETROIT—**Prepared by months** of mobilization planning and educational orders from the War Department, the automotive industry is gearing itself now for whatever demand the nation will impose on it in the carrying out of defense plans.

The general nature of what will happen within the industry is known from the preliminary planning. There remains only the determination of how far the various programs are to be carried — the degree to which M-day will actually be applied. The latter part of last week saw the industry's leaders, scores of them, in conferences with national officials which should result shortly in definite knowledge of the extent of the automotive plants' participation in the program for defense.

Meanwhile, not knowing the percentage of capacity which must be diverted to military purposes, the industry must permit many of the 1941 auto production plans to hang in the balance. In a large degree, of course, the waves after waves of war news have dulled the industry's interest in next year's models. Talk of preparedness has predominated over more routine matters, but, more than that, uncertainties engendered by the war have been a real restraining influence on normal planning and buying.

Ford Holds Up July Schedule

THE past week should have been the occasion for some substantial buying of steel to clear up the current season's requirements, and it might also have been the period for the first serious buying of steel for 1941 models. Instead it was apparent by midweek that steel orders actually were tapering off in several important quarters locally, and it was rumored that one clean-up buy for approximately 50,000 cars for Ford had been cancelled. Later this rumor was verified to the extent that it was learned that the company had held up its July schedule of releases and purchases only temporarily. Uncertainty about exact requirements for the final production period led to the decision to delay the buy until closer estimate based on sales could be made.

The general dullness that marked the week in Detroit was regarded in many quarters as only a lull before a buying splurge that would come when the prospects ahead have been more fully explored. Some gage of the probable extent of military contracts is essential to further planning. Military officers intimately familiar with the scene have mentioned the possibility of using 50 to 60 per cent of the industry's output "in an emergency."

The sales outlook is critical. On the basis of preliminary information, it appears probable that July schedules may be halved as a result of customer coolness. There are traces in sales reports available so far which show an unfavorable trend even in the first 10 days of May. The second 10-day period is known to have been adversely affected by news of Nazi successes in the Lowlands. Currently, the customer reaction is even worse. This, then, is another part of the explanation of the industry's slower buying pace. Under the circumstances, steel and other production requirements could easily be "overbought," and the industry is wary of this.

In technical and production phases, the industry proceeds at an uninterrupted pace. Plans for the General Motors hydramatic transmission were further clarified (see last week's Assembly Line) when it was learned that refurbishing of the Detroit transmission plant would include a one-story addition which will improve the floor layout. The factory now occupies lower floors of the old No. 10 Fisher plant on Theodore Street. This is further confirmation of last week's statement that plans for a new building on the outskirts of the city had been dropped.

The fluid drive of Chrysler, to be built next year in a new plant being erected in Highland Park, is eyed by Army officials as ideal for conversion to use in tanks. Ordinary clutches are subjected to such severe service in tanks that they have always been looked on as a potential source of trouble. The almost indestructible character of the fluid flywheel makes it look like a solution.

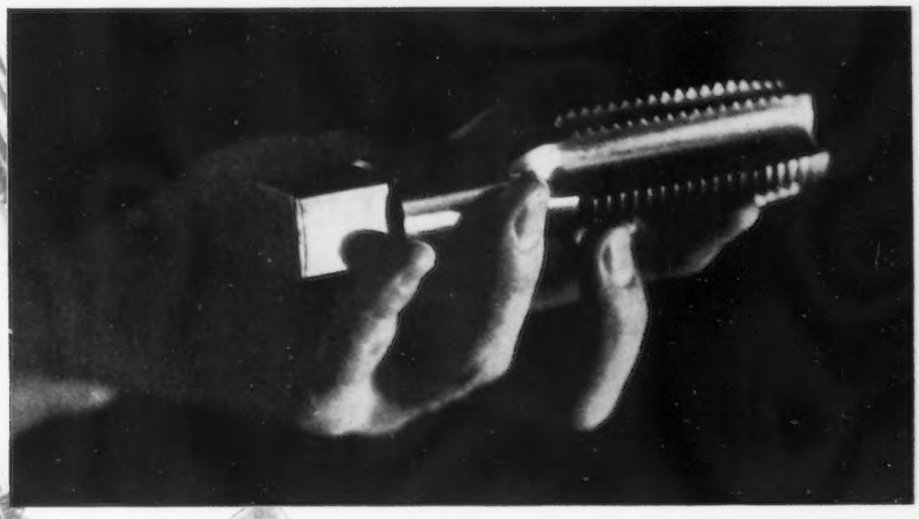
Heavy Press-Forge Plant to Start

A NEW design for the six-cylinder Ford engine now exists, but it is jumping at a conclusion to believe that this power plant will be seen in 1941 chassis. Not only would the tooling present some problem at this time, but it is difficult to believe that a comparatively untested new design would be put into production. The project might mature quickly enough for Ford to spring a surprise on the rest of the industry, but that seems very doubtful, and it is the consensus of informed opinion that the chassis and body will appear at Show time, but with a V-8 engine.

The industry's first plant devoted exclusively to heavy press-type forges will be put in operation this fall by Oldsmobile. The former Ryan Bohn foundry in Lansing has been purchased, along with 50 acres of land for the new type forge shop. Remodeling and some new construction will be started at once, and the plant will begin to operate as soon as equipment is

ACCURACY

means duplicate performance



IT is easy to make *one* good tap . . . easy to make taps in large quantities. But it is *not* easy to make hundreds of good taps so alike that they *all cut the same uniform clean accurate threads.* Yet this kind of *duplicate performance* is a "must" in modern automotive production.

So we were glad to learn that one of the largest American automobile companies has standardized on Pratt & Whitney taps because "they never vary in duplicating performance from one batch to the next."

That is our achievement in making good taps . . . not just *one* good tap but every tap the exact twin of its predecessor in quality, accuracy and *performance.* That makes the difference in smoothing out both production and assembly.

Make the most of the production economies these taps provide. Their accurate duplicate performance will cut your cost. Specify Pratt & Whitney Taps.

PRATT & WHITNEY
Division Niles-Bement-Pond Company
West Hartford, Conn., U.S.A.

PRATT & WHITNEY TAPS

installed. Because of the nature of the new work, it will be fall before full-out production is begun, however. The plant has been planned for several months, but a careful study was made by C. L. McCuen, Olds' general manager, before the "go-ahead" was given. Other forging plants in the auto industry have made use of the high-pressure squeezing method of forming parts from hot billets, but none has yet attempted large-scale operations of this sort.

Orders have already been placed by Olds for some standard equipment including upsetters and hammers but for the most part the plant will be devoted to heavy crank press work. The newness of this type of production will result in slow attainment of the final goal, according to Mr. McCuen, and complete equipping of the shop with newer types of equipment must await trial runs and considerable experimenting with production methods.

Anticipated effects from the cutting off of supplies of Swedish sponge iron will likely be minimized if some of the numerous interested groups proceed with plans to make available new sources of domestic sponge iron. More than a score of proposals have been received by one consumer of the powdered metal, it is reported, and several of the proposals indicate that existing facilities can be enlarged and improved to take care of the demand.

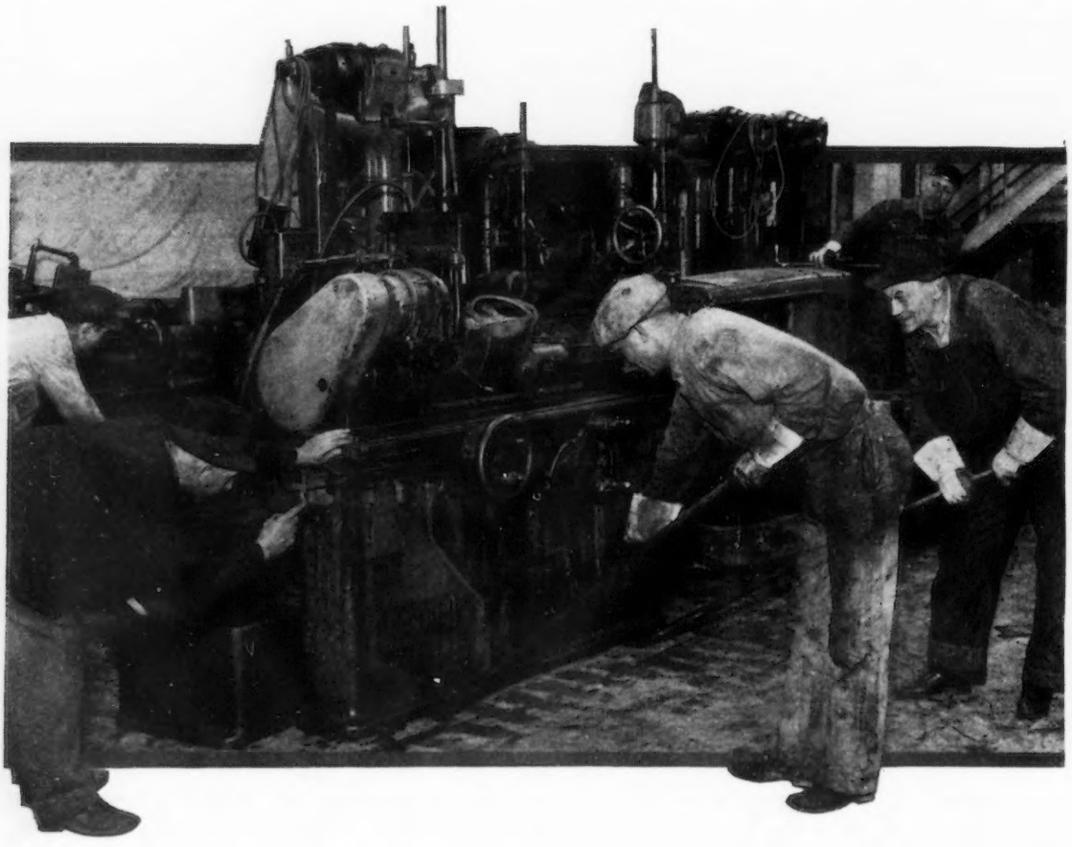
Figuring with astronomical-like accuracy, Pontiac has announced that the two millionth Pontiac car will leave the final assembly line at exactly 11:03 a.m. on June 5. The rear axle of this car, it has been calculated, will be made on the afternoon of June 3; the motor block was poured in the foundry on May 15 and will come off the bank on June 3. The body will leave the Fisher plant some time on the morning of the fifth to "keep its predestined rendezvous," according to plans that are announced. Ceremonies will mark the occasion.

Based upon available sales figures, it is estimated here that sales in the second 10 days of May dropped as much as 30 per cent under the figures for the first 10 days, whereas a year ago a slight increase was registered as the month progressed.

The industry's sales departments in many cases last week issued categorial denials that the sales pattern was abnormal, but at the same time Chevrolet canceled its regular release of sales figures for the second 10-day period without offering explanation. Company officals would not be quoted but admitted that a sudden downward trend was responsible. Ford sales figures, not available at the time of writing, would be released when compiled, a company spokesman said. At the same time, several sources within the company admitted that the trend was downward. The third member of the Big Three has not released sales figures in the past but a spokesman for Plymouth said that the production schedule has not been altered. For the last month Plymouth has been operating only four days a week. Four days a week has been more or less common for the industry since the peak of production was passed.

Production dropped last week to 96,810 passenger cars and trucks from the previous week's level of 99,030, according to Ward's Automotive Reports. In view of the circumstances, the lower production rate is not at all significant. In fact, last year in the corresponding week production slumped 12,405 units, from a level of 80,145 to 67,740. Thus currently production is increasing its margin over last year but it is believed that the full impact of the suddenly lowered sales level has not had time to affect production.

o o o

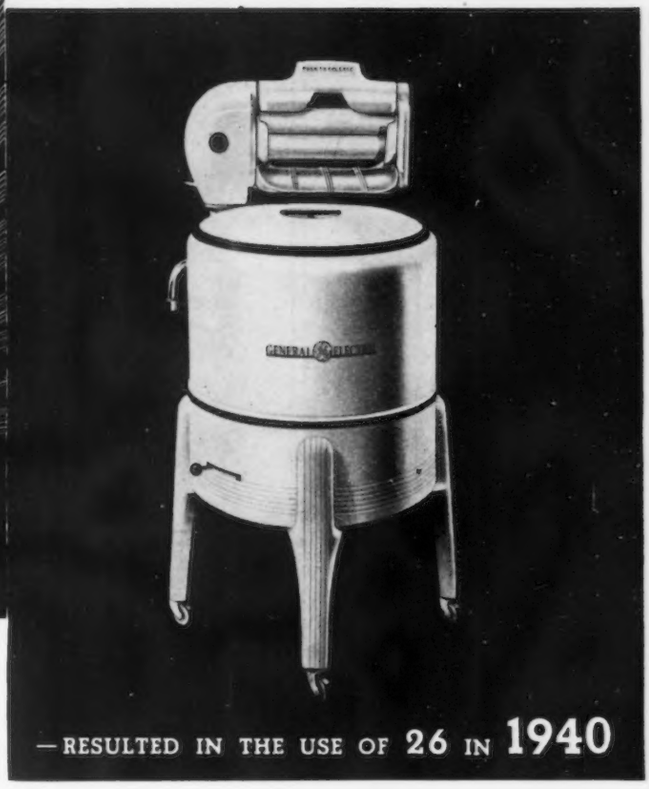


MACHINERY is now being moved into the new BUICK building where axles will be built for 1941 models. Only a week before this photograph was taken, the wood block floor was laid in the building for which ground was broken on March 1. Erection of steel and masonry took about 60 days. Now the schedule calls for shifting machinery into the structure without interrupting current (1940) production. The next step will be retooling for 1941 changes, again without serious halt in the flow of parts.

STAMINA

—DIE CASTINGS STAY ON THE JOB

9 DIE CASTINGS SPECIFIED IN **1931**



—RESULTED IN THE USE OF **26** IN **1940**

Many eyebrows were raised when 9 ZINC Alloy Die Castings were specified for decorative and working parts of the 1931 washing machine shown here. But the fact that 26 die castings are similarly employed on a 1940 model—produced by the same manufacturer—is of greater significance to design engineers.

To those unfamiliar with ZINC Alloy Die Castings, this progress story offers convincing evidence of their suitability for metal parts that are under mechanical stress. To the thousands of present users of die castings, the story gives additional assurance that they are taking advantage of one of the most economical and efficient methods of parts manufacturing.

The successful application of ZINC Alloy Die Castings to washing machine production is just one of hundreds of similar case histories to be found in the files of the country's commercial die casters. If you are not thoroughly informed on the physical and economic advantages offered by this modern metal and production method, we suggest that you consult a commercial die caster—or write to The New Jersey Zinc Company, 160 Front Street, New York City.

Copies of earlier advertisements in this series gladly mailed on request.

ZINC
ALLOY DIE CASTINGS

The Research was done, the Alloys were developed, and most Die Castings are made with

HORSE HEAD SPECIAL (99.99+% Uniform Quality) ZINC

Washington

BY L. W. MOFFETT
Washington Editor

• New Deal will seek to keep firm hold in United States defense program, using business men only in an advisory capacity. Roosevelt opposes relaxation of labor laws

WASHINGTON — As preparation for national defense begins to take form, the New Deal has made it clear that it proposes to firmly take control of the job. Industry will be permitted only a relatively minor role. There will be no War Industries Board, which directed industrial mobilization in the first World War. These disconcerting, though not unexpected, revelations have been made at the White House.

With an extreme scarcity in its enormous civilian personnel of almost 1,000,000 of executives who have even a fundamental knowledge of the functioning of industry, the government, through its many agencies, will direct the preparedness drive and assign industrialists to a subordinate position.

Known chiefly as the world's greatest spender as former WPA head, and a foe of business, ironically enough, the major figure now directing industrial defense plans apparently is the ailing Harry L. Hopkins, who is on the Federal payroll as Secretary of Commerce. His presence at the Department of Commerce has been limited to a few hours each week, if that much.

Mr. Hopkins, who has been a "guest" at the White House, is said to have been selected as chief adviser to the Administration regarding industrial mobilization.

Business Council Visits White House

LAST Thursday members of the Business Advisory Council, accompanied by Mr. Hopkins, went to the White House, and through Chairman William L. Batt presented a resolution to the President pledging the council's full aid in carrying out the defense program.

The President has said that under no circumstances will the Administration sanction a weakening of the social gains attained during the last seven years. There will be no relaxation, he said, of labor standards set up by the Walsh-Healey and Wage-Hour acts. Industry has urged relaxation as a means of speeding up the national defense program.

In carrying out the defense program, the President said the type of the organization he had in mind might resemble the War Industries Board, but that he was drawing no diagram.

Subsequently Stephen Early, secretary to the President, said that business men who might be called in would fit into positions in the government, some of them perhaps as liaison men. But he emphasized that the President had no intention whatever of creating any involved, complicated machine for national defense or emergency reasons.

The definite view is held that while existing New Deal agencies could perform some of the work done by the War Industries Board and, therefore, not calling for its exact duplication, there is a pressing necessity to set up an organization of business men under the framework of the old board. It now seems probable this idea was discarded when the New Deal suddenly disbanded the War Resources Board last November after an existence of only about three months. The board was headed by Edward R. Stettinius, Jr., chairman, United States Steel Corp. Unavailing efforts have been made to have the White House release the report made by the board.

Speaking of the President's plan, Mr. Early said:

"The President's idea is to have some gentlemen with experience and qualifications come in and act as coordinators and liaison men between the various Government departments and agencies already existing.

"No new legislation will be necessary except to take care of salaries for some of these men through a deficiency appropriation bill. Some of them may be willing to become dollar-a-year men.

"They will come in, not to supersede, but to work with, advise with and coordinate with the officers of the Government."

The plan, Mr. Early said, would be a simplification of the system that existed in 1917 and 1918. Nevertheless it conflicts with the industrial mobilization plan which had been prepared by the War Department.

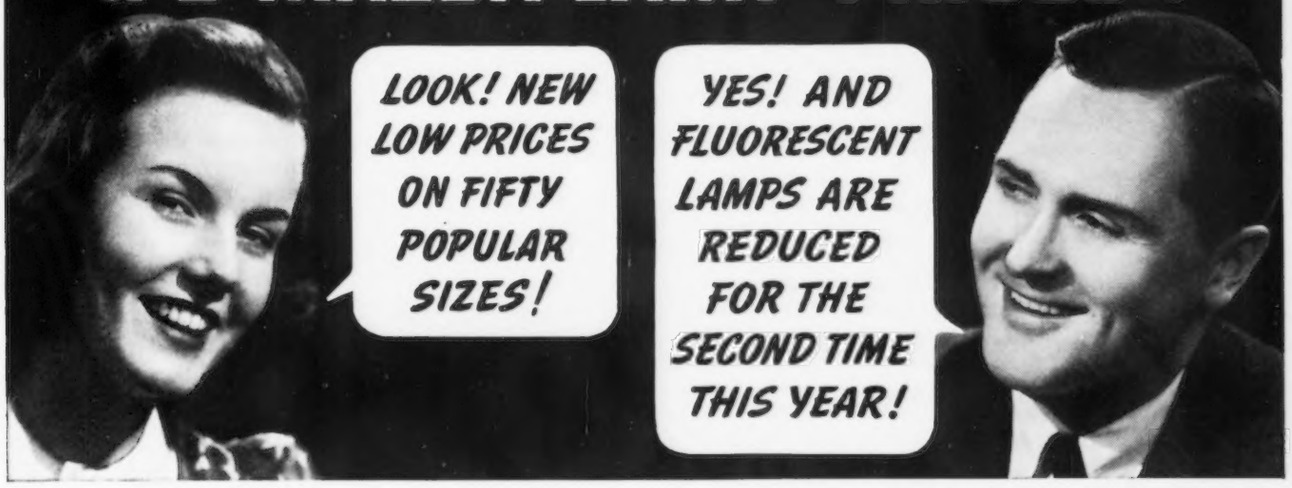
Following up the President's statement that he did not want to see a single war millionaire created as the result of national defense needs, though adding that industry is entitled to reasonable profits, Assistant Attorney-General Thurman W. Arnold, head of the Department of Justice's anti-trust division, has announced that he will crack down on any attempt to charge all that a rising market can bear in view of the armament program.

Characterizing them as "the first line of defense" against undue profits, Mr. Arnold has gone on record in favor of rigid enforcement of the anti-trust laws.

Patriotism Won't Be Effective

UNLIKE Bernard M. Baruch, chairman of the World War Industries Board, who suggested that Mr. Roosevelt be given emergency power to suspend the anti-trust laws as a means of speeding production for national defense, Mr. Arnold thinks that nothing short of real enforcement of the Sherman Act will do the job he has in mind.

GENERAL ELECTRIC REDUCES G-E MAZDA LAMP PRICES !



20TH MAJOR PRICE REDUCTION IN 19 YEARS!

New Prices Effective June 1, 1940

200 watt	was 30¢	now 27¢
300 watt (medium base)	was 50¢	now 45¢
300 watt (mogul base)	was 70¢	now 65¢
500 watt	was $1.20	now **$1.10**
750 watt	was $3.75	now **$3.25**
1000 watt	was $4.00	now **$3.50**
1500 watt	was $5.75	now **$5.25**

PRICES ALSO REDUCED ON THESE POPULAR SIZES

7½, 15, 25 watt G-E MAZDA lamps		now 10¢
40, 50, and 60 watt	were 15¢	now 13¢
75 and 100 watt	previously reduced to	15¢
150 watt	previously reduced to	20¢

Prices also reduced on Silvered Bowl, Daylight Lamps, and Spotlight and Floodlight Lamps

MAZDA "F" FLUORESCENT LAMPS *(Daylight and White)*

15 watt T-8	was $1.15	now 95¢
15 watt T-12	was $1.45	now **$1.25**
20 watt T-12	was $1.65	now **$1.25**
30 watt T-8	was $1.50	now **$1.25**
40 watt T-12	was $2.30	now **$1.90**

Prices also reduced on blue, green, pink, gold and red

MAZDA "H" MERCURY LAMPS

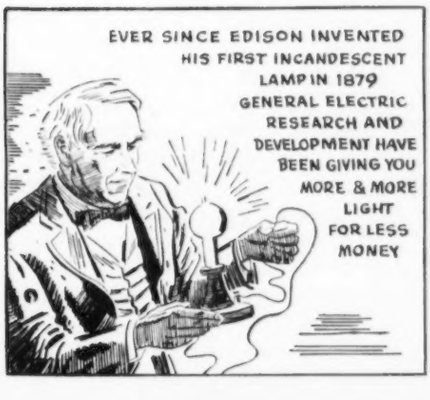
400 watt	was $12.50	now **$11.00**

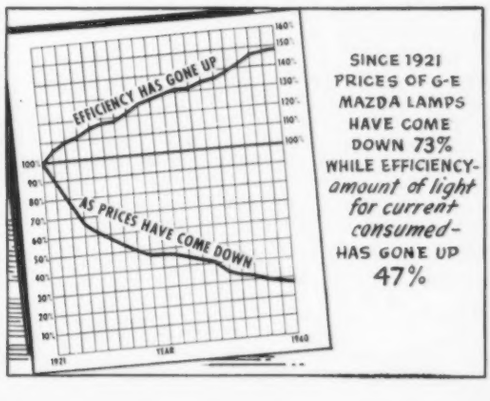
ROUGH SERVICE LAMPS

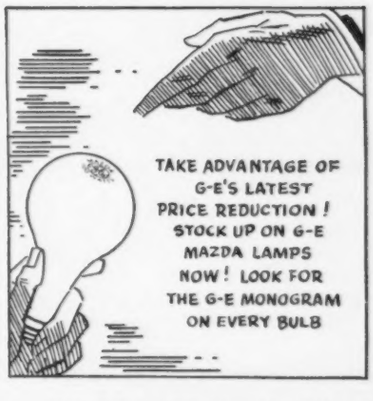
50 watt	was 30¢	now 25¢
100 watt	was 45¢	now 35¢

G-E MAZDA LAMPS

GENERAL ELECTRIC


EVER SINCE EDISON INVENTED HIS FIRST INCANDESCENT LAMP IN 1879 GENERAL ELECTRIC RESEARCH AND DEVELOPMENT HAVE BEEN GIVING YOU MORE & MORE LIGHT FOR LESS MONEY


EFFICIENCY HAS GONE UP
AS PRICES HAVE COME DOWN
YEAR
1921
1940
SINCE 1921 PRICES OF G-E MAZDA LAMPS HAVE COME DOWN 73% WHILE EFFICIENCY-amount of light for current consumed-HAS GONE UP 47%



"Appeals to patriotism were not effective in the last war," Mr. Arnold observed, "and will not be effective in this one."

Another high Justice Department official, however, conceded privately that as industry swings into the expanded defense program it may be advisable in the interest of hastening some defense orders to permit units of industry to get together and allocate production. At the present time this official saw no likelihood for relaxing other provisions of the anti-trust laws. He pointed out with emphasis that the maintenance of safeguards against price fixing is quite as essential as affording protection against sabotage.

In insisting that the Administration would not yield any of its "social gains" the President said he hoped for a 40-hr. or 42-hr. week as a standard in the national defense work, claiming that it will provide employment for a large number of men who are now idle. A reflection of the Administration attitude was seen in a change made in the Navy bill, which in its original form authorized the President to suspend the Walsh-Healey bill in order to speed shipbuilding in government and private yards. As approved the bill authorized more flexible working conditions, but required time-and-half pay for all hours above the 40-hr. basic week.

This change clearly was due to organized labor pressure. Secretary of Labor Frances Perkins, playing her part in the New Deal program of complying with labor demands, said she had reported to the President that skilled workers are available for most of the defense program, a statement that runs counter not only to contentions of industry, but to a recent declaration previously made by President Roosevelt, who said that there is a great shortage of skilled workers.

"There may be a shortage in some spots, such as tool and die making, pattern making and design drafting, but these are small groups," Miss Perkins said.

She lightly brushed aside the question of skilled labor shortage by saying that many skilled mechanics can be chosen from the 6,000,000 names on the Federal Employment Service.

As for the Administration attitude in the event of strikes obstructing the national defense program, the President dismissed this point by saying he thought the country was too well united to permit strikes interfering with the program. His observation was made after his attention was called to a statement by John L. Lewis that CIO would organize the aircraft and all other industries concerned with the national defense program, an undertaking which the President said was entirely legal.

Referring to a conference of War, Navy and Treasury officials with aircraft manufacturers, the President said it was the general opinion that they have ample capital to finance plant expansion. The "bottleneck" he said, is in the production of 1600-hp. fighting planes. The need, he said, is for additional facilities. One or two of the larger engine companies was said to have authorized production of their engines in other plants, while another company was declared to have fallen down on production.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

SHOW ME WHERE I'M ANY BETTER OFF THAN A GUY IN TH' PEN--I PUT ALL DAY IN THIS CEMENT AND STEEL GALLEY, AN' I DASSN'T GO OUT AT NIGHT ER SUNDAYS FER FEAR I'LL SPEND A NICKEL AN' CAN'T MAKE MY PAYMENTS ON MY HOUSE, CAR AN' RADIO! ALL I GET OUT O' LIFE IS WORK, SLEEP AN' EAT--A GUY IN TH' PEN GETS THAT, DON'T HE? HAH-- MORE-MORE!!
I THINK I'LL MOVE--WHAT'S THAT GANG OVER THERE TALKIN' ABOUT? NO, THAT WON'T DO--THEY'RE TALKIN' POLITICS--OR IS IT WAR? YOU SHOULD HAVE PLEASANT CONVERSATION WITH MEALS
IT'S HARD TO FIND THESE DAYS-- I THINK THAT'S WHY THERE'S SO MUCH INDIGESTION --LET'S GO OVER TO THAT BUNCH-- I HEARD A GUY LAUGH!
J.R.WILLIAMS
T. M. REG. U. S. PAT. OFF. COPR. 1940 BY NEA SERVICE, INC.
THE SOUR HOUR
5-23

President's Ruling On Tariff Act Held Final

Washington

• • • **Declaring that** proclamations of the President under the flexible provisions of the tariff act are not subject to review, the Supreme Court has reversed an opinion of the Court of Customs and Patent Appeals. The Customs Court had held invalid a proclamation by the President on May 1, 1934, increasing the duty on canned clams imported from Japan. The opinion was delivered by Mr. Justice Douglas.

The Tariff Commission found that the rate of duty on foreign value which would be necessary to equalize the difference in the costs of production of the domestic article and the Japanese article exceeded the then existing statutory rate by more than 50 per cent, the maximum duty increase permissible. The President accordingly increased the duty by assessing a 35 per cent ad valorem rate based on the American selling price.

It was on an appeal for reappraisement on an importation on the basis of the American selling price that the Customs Court held the proclamation invalid.

500 Ships in 10 Years Building Program of Maritime Commission

Washington

• • • **With its fixed** minimum national defense requirements calling for the construction of 500 ships in 10 years, the United States Maritime Commission has, since it was established two and one-half years ago, let contracts for 152 vessels of considerably more than 1,000,000 gross tons. They are being built in 15 yards in 12 states on the Atlantic, Pacific and Gulf Coasts.

In reporting before the Propeller Clubs of the West Coast at San Francisco, Wednesday, on progress of the commission's program. Admiral Emory S. Land, chairman of the commission, said that the program should go on indefinitely to the end of the decade at the approximate rate of 50 new ships each year.

He said that estimates indicate that 50 per cent of the cost goes for materials and equipment, 40 per cent for shipyard labor and the remaining 10 per cent for such items as taxes, insurance, transportation, administrative costs and profits. Within the next few months, Admiral Land estimated, there will be approximately 35,000 in the construction of Commission ships. They will be paid an average of more than $31 per week.

$35,000,000 Asked for Strategic Materials

Washington

• • • **President Roosevelt** has asked Congress for an additional $35,000,000 for purchase of strategic minerals. This brings the total request for this purpose up to $60,000,000 for 1941. Congress has appropriated $12,500,000, and last week the President asked for an additional $12,500,000.

The President also has asked for an appropriation of $2,000,000 for an airplane research laboratory to be built in 1941. He also requested an authorization up to $6,400,000 for the National Advisors' Committee for aeronautics to contract for a site and to supervise construction of the laboratory.

THAT HIGH-LIGHT PATTERN MEANS SHEFFIELD

THE SHEFFIELD plug gages are lapped by a special process developed entirely by Sheffield, which produces that characteristic high-light pattern—your guarantee of the finest in gages and ultimate gage economy.

This lapping process follows finish grinding and removes the outer skin slightly softened by the grinding operation. The lapping takes the surface of the Sheffield Gage down to the hardest layer of metal produced in nitrogen hardening—considerably harder than the surface of conventional gages. In addition, it produces a true cylindrical surface, smooth and accurate.

All Sheffield Plug Gages, both plain and threaded, are Nitrigages with this very hard surface (between 900 and 1100 Monotron Brinell). The base metal, Sheffaloy, is tough and ductile and will not break or chip on accidental impact.

Standardize on Sheffield Gages for maximum economy.

SHEFFIELD
GAGE CORPORATION • DAYTON, OHIO, U.S.A.
MASTER GAGEMAKERS
NITRIGAGES

News of Industry . . .

Treasury Will Consolidate State Procurement Offices

Washington

• • • **Consolidation of** the 42 state procurement offices under 20 regional districts to conform to a reduction in appropriations available for the fiscal year 1941, is planned by the Procurement Division of the Treasury Department. The new arrangement will be in operation by July 1, 1940. Thus far, tentative approval has been given opening of a regional office in Kansas City, to cover Missouri, Oklahoma, Kansas, Nebraska and Iowa. Location of the main offices for the other 19 regional districts is still under consideration.

Portuguese Mission in U. S. Purchases Plates, Axles

Philadelphia

• • • **The mission maintained** here by the Portuguese Government to facilitate delivery of 28 stainless steel railroad cars, being built by E. G. Budd Mfg. Co. for the Portuguese National Railway, has recently made several supplementary steel purchases. These purchases, which include plates and forged axles, are for use by the Portuguese Railroad. J. Monteiro heads the mission.

112-Year Old Warehouse Company Plans Expansion

• • • **Albert J. Bragg,** president of the 112-year-old warehouse firm of Egleston Brothers & Co. Inc., Long Island City, N. Y., will expand the company's warehouse facilities at 31-07 Borden Avenue. The new addition includes a three-story office building and additional storage space. New steel handling equipment is also being installed. When the new section is completed, around June 1, the plant area will exceed 100,000 sq. ft.

The company was established in 1829 as Egleston & Battell, dealing primarily in imported bar iron. Among the early products sold by the company were iron strips, which were placed on top of wood rails to protect the rails from friction caused by wooden-spoked locomotive wheels. Albert J. Bragg is president, J. F. Bragg, treasurer, and F. Cook, secretary.

Otis Steel Will Rebuild Riverside Works Stack

Cleveland

• • • **The 600-ton No. 2** blast furnace at the Otis Steel Co.'s Riverside works will be rebuilt at a cost of $200,000. This furnace was blown in May 20, 1930, and produced 1,735,500 gross tons on a single lining. While it was operated at half and two-thirds of capacity during slack periods, it never was completely down. Design and engineering work connected with the rebuilding and modernization will be handled by Otis' own engineering department.

↓ ↓

• • • **After having** been in continuous operation for six and one-half years the Henry blast furnace at the Ford Motor Co. Rouge plant, Dearborn, Mich., is to be shut down so as to permit modernization. Contract for the work has been awarded to the Arthur G. McKee Co., Cleveland. The reconstruction job, which will include the relining, will get under way June 15 and the contract calls for its completion by Aug. 23.

Luncheon Will Commemorate Rolling of First Steel Rail

Chicago

• • • **The 75th anniversary** of the rolling of the first steel rail in the United States will be observed by the Traffic Club of Chicago at a commemorative luncheon to be held at the Palmer House, June 10. Features of the event will be talks by Ralph Budd, president of the Burlington Road, and Clarence Randall, vice - president, Inland Steel Co.

Sales of Electric Trucks Reach New Peak in April

• • • **Sales of electric** industrial trucks and tractors in April rose to a new high for the current year at 120 units, compared with 112 in March, 79 in February and 81 in January, according to Industrial Truck Statistical Association.

Value of these sales, exclusive of cost of batteries, charging equipment, gasoline-electric units and other accessory equipment, was $423,381 in April, $376,440 in March, $288,820 in February and $273,383 in January. Heaviest demand in April was for cantilever trucks, which accounted for 79 of the 120 units sold in the month.

NLRB Certifies SWOC for Central Foundry Employees

Washington

• • • **The National Labor** Relations Board has certified CIO's Amalgamated Association of Iron, Steel and Tin Workers of North America, Lodge No. 2133, through SWOC, as sole collective bargaining agency for the production and maintenance employees of Central Foundry Co., Bessemer, Ala. The CIO won an election by 249 to 26 votes.

Toledo Harbor Sets New Coal Loading Record

Toledo

• • • **Toledo harbor,** second in tonnage on the Great Lakes last year, is busier than ever before. An all-time record for coal-loading on the Great Lakes was set at the Chesapeake & Ohio docks here May 8 when the one terminal dumped 107,319 tons of coal carried in 1822 cars into 16 Lake freighters in the 24-hr. period from 12.01 a.m. to 11.59 p.m.

Tonnage handled from the port so far this season is approximately three times the early season volume last year when mine difficulties restricted the movement.

Relief Outlay To Hold Despite Arms Spending

Washington

• • • **Passage by the** House last week of a $1,111,754,916 relief bill indicates that, despite the Administration's national defense outlays, it does not expect to appreciably cut relief expenditures. The measure carried a $975,650,000 WPA fund which the President has authority to spend in eight months but it fixed a limit on the number of workers on relief rolls during the five campaign months ending in November.

Under another provision, sponsored by Representative Francis Walter, Democrat of Pennsylvania, the employment on WPA projects of Communists and members of Nazi bunds will be prohibited. Prospective candidates for relief will be required to sign affidavits that they are members of none of these organizations.

President Roosevelt has asserted at a recent press conference that while the defense program is going to give employment to some people it is going to provide virtually no help to those on WPA rolls. Observers had difficulty reconciling this statement with remarks by high Administration officials that a shortage of skilled labor exists.

Mr. Roosevelt also is understood to be responsible for the elimination from the bill of a proposal which would have earmarked funds for the continuation of the PWA program. Failure of the earmarking proposal to pass spells defeat for any form of PWA revival.

Before the House passed the relief measure by a vote of 354 to 21, Mr. Roosevelt passed the word along to Congress that, despite plans to speed up the national defense, a relief bill was to go through as quickly as possible. Mr. Roosevelt called it clear that the country cannot afford to cut people from relief this summer or fall. He said that so far private employers are just not giving them the work.

Administration officials who favor a WPA program, as contrasted with the heavier types of construction projects built under PWA, pointed out that under the latter projects a large part of the funds go into the purchase of material with the result that a given amount of money does not employ as many people. Mr. Roosevelt cited the additional employment of workers in steel towns as the result of PWA expenditures, raising the query of how this directly benefits the particular person on relief in some other small town. It was his observation that the problem has to be met from the standpoint of individuals on relief.

Members of Congress who are convinced that the WPA nurtured a gigantic political machine were successful in obtaining the passage of a new provision which fixed the maximum number of workers who may be employed in the five national campaign months, July through November.

While opponents of this provision pointed out that WPA administrative ranks have been purged of ward healers and of politicos during the last few months, and that relief machinery has been improved, sponsors of the anti-politics provision insisted that their proposal would eliminate the padding of relief rolls in campaign periods for political purposes.

Even though Mr. Roosevelt turned thumbs down on any revitalized PWA, he indicated that henceforth the housing program of the United States Housing Authority will probably be tied in more closely with national defense.

He has suggested to House members that future appropriations be made large enough to take care of plans to finance projects to house from 4000 to 5000 employees, where such construction is found necessary as a result of industrial expansion growing out of the defense program.

Coming Meetings

June 3 to 6—Annual international convention and Inform-a-Show, National Association of Purchasing Agents, Cincinnati.

June 6 and 7—Grinding Wheel Manufacturers Association and Abrasive Grain Association, Niagara Falls, N. Y.

June 9 to 14—Society of Automotive Engineers summer meeting, White Sulphur Springs, W. Va.

June 17 to 20—American Society of Mechanical Engineers, semi-annual meeting, Milwaukee.

June 24 to 28—American Society for Testing Materials, 43rd annual meeting, Atlantic City, N. J.

Sept. 24 to 27—Association of Iron and Steel Engineers meeting and exhibition, Chicago.

Oct. 2 to 5—Electrochemical Society, Ottawa, Canada.

Oct. 21 to 25—National Metal Congress, Cleveland.

Locomotive Shipments of 54 Highest Since December, 1937

Washington

• • • **Figures compiled** by the Bureau of the Census show that 54 railroad locomotives were shipped by manufacturers during April, the highest monthly total since December, 1937, when 56 were shipped.

Ten of the April shipments, all steam propelled locomotives, were for export. Domestic shipments comprised six steam, and 37 diesel-electric locomotives. One was classified as "other."

Shipments of locomotives during the first four months of this year, the bureau reported, numbered 161 compared with 87 during the same period last year, and 130 during the first four months of 1938.

Lake Erie Limestone Co. Plant to Open Next Month

Youngstown

• • • Lake Erie Limestone Co., controlled by Republic Steel Corp., expects to begin production of furnace flux stone in its new plant southeast of Lowellville late in June. Approximately $300,000 is being spent in new equipment. Other equipment is being brought from the old Midland plant. Modern crushing equipment has been provided and a production of 3000 tons of stone a day will be possible.

The Hunter Construction Co. is erecting the new plant, located just north of Bessemer. The old Midland quarry crusher was along the Mahoning River Valley west of Edenburg.

Canada Speeds Up Output Of War Materials

Toronto

• • • **Canadian industrial leaders** are speeding their efforts toward greater production for war needs. Twenty shipyards are engaged in the production of 90 vessels of war; there are under construction 82 aerodromes, 175 construction projects, including coastal fortifications, submarine defenses and hangars. There are on order 9000 motor vehicles at a cost of $14,000,000, of which 3000 vehicles already have been delivered overseas. Following up its enlarged program the Canadian Government's expenditure rapidly is being stepped up to $3,000,000 daily. The greater part of new contracts now being placed are for motor vehicles, aircraft and supplies, guns, shells, and similar materials for the actual carrying on of the fight in the battle fronts of Europe. At the present time contracts for munitions on the books of Canadian companies are valued at $80,000,000, and these are being added to rapidly on behalf of both the Canadian and British Governments.

To further stimulate Canada's war effort, action is being taken to curtail expenditure by the suspension of construction programs on public works account in various parts of Canada. Instructions were issued by the Department of Public Works, Ottawa, to suspend building operations on the new terminal post office at Toronto, costing $2,500,000, while other large projects at Ottawa and various other centers also are to be held up for the present.

The capacity of Canadian plants to produce the increasing volume and variety of munitions is being developed by the Department of Munitions and Supply. It is stated that work has just started here on the manufacture of 308,000 detonator bursters. Heretofore these bursters have been purchased abroad, but for the future will be turned out in Canadian plants. Under the British Commonwealth Air Training Plan some 800,000 bursters will be required in the next 12 months and arrangements have been concluded for manufacture of these as well as many other types of munitions in Canada.

Demand for steel is gaining at a rapid rate. Following the request of the Federal Government for seven-day week and 24-hr. day operations, a much greater load will be placed on primary steel producers in this country to meet all demands. New booking for spot and future delivery has started a new upswing and officials of the various steel companies state they are assured of capacity production for the remainder of this year and as long as the European war lasts, with prospects for much greater demand for steel as new plants enter the field for making munitions, guns, etc. At the present time, to meet all demands for steel, especially plates and sheets for truck, ship and car production, imports from the United States continue at a high rate and other larger orders are pending.

Contracts placed through the Department of Munitions and Supply, Ottawa, with Canadian firms during the past week were 915 in number with total value of $6,261,425, which brings total awards to date through this medium to $289,000,000, of which about $73,000,000 was for British account. Mechanical transport and aircraft contracts are among the more important contract placements going out at this time. Orders placed during the week include:

Mechanical transport—John Goodison Thresher Co., Ltd., Sarnia, Ont., $33,020; Massey-Harris Co., Ltd., Toronto, $29,143; Barry Steel Products, Ltd., Montreal, $44,216; Cockshutt Plow Co., Ltd., Brantford, Ont., $20,790; Brantford Coach & Body, Ltd., Brantford, Ont., $57,127; Wilson Motor Bodies, Ltd., Toronto, $35,728; Robert Elder Carriage Works, Ltd., Toronto, $18,719; Smith Brothers Motor Body Works, Toronto, $13,296; Canadian Top & Body Corp., Ltd., Tilbury, Ont., $215,609; W. D. Beath & Sons, Ltd., Toronto, $33,658; Gar Wood Industries of Canada, Ltd., Windsor, $116,007; Truck Engineering, Ltd., Woodstock, Ont., $5,337; Metallic Roofing Co. of Canada, Ltd., Ottawa, $146,466; Chrysler Corp. of Canada, Ltd., Windsor, Ont., $32,872; General Motors Products of Canada, Ltd., Oshawa, Ont., $11,800; Ottawa Car & Aircraft, Ltd., Ottawa, $25,843; Ford Motor Co. of Canada, Ltd., Windsor, Ont., $51,292.

Aircraft supplies—Noorduyn Aviation, Ltd., Montreal, $74,985; Canadian Pratt & Whitney Aircraft Co., Ltd., Longueuil, Que., $12,943; National Steel Car Corp., Hamilton, Ont. Horton Steel Works, Ltd., Toronto, received contract for naval stores valued at $40,060.

Armstrong Tool Firm Founded 50 Years Ago

• • • **Armstrong Bros.** Tool Co., Chicago, this year is celebrating its 50th anniversary of service to American industry. The company was founded in 1890 when five mechanically minded brothers from Chicago, bearing the name Armstrong, hit upon the idea of using one permanent shank or holder into which cutting bits of tool steel could be inserted. These tool holders were sold as a sideline to the brothers' chief business of building bicycles.

When bicycles began to lose ground early in 1900, four of the brothers, Paul, John, Hugh, and James Armstrong, decided to concentrate on the tool line. In the 80's, James Armstrong made and operated the first power-driven vehicle to travel the streets of Chicago and in 1887 he was arrested while driving his steam-propelled car because he lacked a permit to operate a steam boiler.

Seven descendants of the Armstrong brothers are today associated with the company, which manufactures tool holders, machine shop tools, wrenches and pipe tools.

Cuba's First Quarter Steel Imports Doubled

Washington

• • • **As compared** with first quarter imports of iron and steel products into Cuba in 1938, imports for the first quarter this year increased twofold, with the United States accounting for more than 98 per cent of the total.

A Commerce Department dispatch reported that competition from European supplies virtually has disappeared and that a larger proportion of the Cuban demand for wire nails has been supplied by American producers.

Dies Finds Himself Back in Good Graces of President Roosevelt

Washington

• • • **The Dies Committee,** which has been investigating un-American activities since August, 1938, frequently arousing the wrath of New Deal leaders, was back in the good graces of the Administration this week after receiving a Presidential pat on the back.

Mr. Roosevelt pointed to the activities of the Dies Committee in explaining a statement by Attorney General Robert H. Jackson that the President "anticipated and prepared to meet 'fifth column' activities in the United States many months ago."

Chairman Martin Dies, Democrat of Texas, whose committee heretofore has encountered New Deal opposition at every turn, promptly announced that he would be glad to receive the cooperation of the White House in view of the national defense outlook.

Mr. Jackson referred to preparations to meet undercover activities when he announced that the Department of Justice, in connection with the transfer of the immigration and naturalization service to his department, was launching a move to require the registry of some 3,500,000 aliens as a defense measure.

Mr. Jackson said industrial plants had not requested the FBI to fingerprint employees, pointing out that the subject had not been brought up and that so far it has been the policy of the FBI to limit their fingerprinting services to police departments throughout the country. The Attorney General said that the FBI officers were not participating in a reported purge of aliens in Detroit industrial plants working on government contracts, explaining that the FBI is not a government police force but rather purely an investigating unit.

MARTIN DIES, Democrat from Texas, whose House Committee has been investigating un-American activities, was surprised this week to find himself back in the President's good graces.

o o o

Queried as to whether plants working on government contracts were being accorded special scrutiny to assure added protection, the Attorney General asserted that FBI men are merely placed at their disposal when requested. After they are called in under these circumstances, he added, they recommend proper methods for safeguarding units against sabotage by suggesting improved physical layout of premises as a protection against fire, trespassers and the loss of designs belonging to the government or other data pertaining to military secrets.

The whole subject of the FBI's investigating power has been a delicate subject in Washington in recent months.

Pending in the House is a request by Chairman Dies for $100,000 additional to continue the activities of his committee. After the Labor Department's immigration and naturalization service was ordered transferred to the Department of Justice, Representative Noah M. Mason, Republican of Illinois, demanded the resignation of Secretary of Labor Perkins alleging that the transfer would cover up the "maladministration" of the service.

INDUSTRY NEEDS $4-TO-5 BILLIONS OF PLANT ADDITIONS YEARLY

• • • **The Brookings** Institution, differing from the concept that this country has reached a stage of "economic maturity," reported this week that annual additions of from four to five billions of dollars to productive plants and equipment, and around six billions to housing facilities, will be necessary in the next generation to provide "a reasonable satisfactory standard of living."

Making public the results of a two-year investigation of factors responsible for stagnation of the capital markets, the institution found that "the possibilities of further development of private enterprise are adequate to absorb the nation's capital and labor resources for many years to come." The report said that re-establishment of stable conditions depend upon (1) the removal of unnecessary impediments to the flow of funds into constructive capital developments; and (2) the restoration of confidence in the future of private enterprise.

The institution characterized the effect of present tax laws as serious, emphasized that the primary need is for the expansion of capital enterprise, and added:

"Government policies and action have impeded the flow of capital into constructive developments in several ways. Taxation policies have tended to drive investors to high grade securities; regulation has raised the costs and increased the risks of capital flotations; the persistence of huge deficit spending has undermined confidence in public credit; the development of a maze of Government lending agencies has narrowed such private inventment channels as remain."

Captive Mines Refused Coal Act Exemption

Washington

• • • **On the heels of** the recent Supreme Court decision holding the National Bituminous Coal act constitutional, the Department of Interior Bituminous Coal Division has issued an order denying the application of the Youngstown Sheet & Tube Co. for exemption from the minimum price provisions of the act. Simultaneously, it denied exemption to coal produced by the Union Pacific Coal Co. and consumed by the Union Pacific railroad, though some of the output is sold in the open market.

While the two cases are not entirely parallel, the findings in each instance had the effect of declaring the affected mines are not captive mines within the meaning of the act and are not entitled to exemption as "coal consumed by the producer."

The Youngstown Sheet & Tube Co. case relates to the Central Co., and the Mahoning Co., Ohio corporations, which mine coal from land the steel company leases in Columbiana County, Ohio. The steel company has contracts with the coal companies, consuming their output. The coal, it was said, is mined at prices ranging from $1 to $1.25 a ton. Exemption was asked under section 4 of the coal act which provides that the law "shall not apply to coal consumed by the producer or to coal transported by the producer to himself for consumption by him."

Rejecting as either "irrelevant or readily distinguishable" cases cited by the company in support of the application for exemption, Director Howard A. Grady of the Coal Division, expressed the opinion that the company is not a producer of coal "within the contemplation and design of the act." Pointing out that the coal is mined by the contractors, Director Grady said that they paid a fixed sum per ton for coal mined and delivered.

The steel company's position in the production picture is not apparent. In every real sense, it was declared, with respect to the coal supply from the contractors, the Youngstown company has not become a "producer" but rather has left its "consumer" position and mobility unchanged.

"The ultimate aim of the Youngstown company in pursuing a program of leasing coal lands and hiring contractors to operate them is to supply its entire need for steam coal, 100,000 to 300,000 tons per year," the director stated.

He added that although the coal transactions involved were in intrastate commerce, "The delivery and transportation of the coal to steel plants of the Youngstown company is a matter or transaction which directly affects interstate commerce and is subject to regulation under the act."

Finished Steel Production in 1939 Totals 39,003,556 Tons

• • • **The American Iron** and Steel Institute has issued detailed statistics on 1939 production.

Steel ingot production, including steel for castings, totaled 52,798,714 net tons, of which 48,409,800 tons was open hearth, 3,358,916 tons bessemer, 931 tons crucible, 1,029,067 tons electric steel. Ingot production, exclusive of steel for castings, was 52,537,439 tons. Of the total steel produced, 2,317,382 tons was by the duplex process.

Production of alloy steel ingots and castings totaled 3,211,955 tons, of which 2,458,854 tons was open hearth, 3486 tons bessemer, 231 tons crucible, 749,384 tons electric.

Hot rolled iron and steel products totaled 39,003,556 net tons, divided as follows:

	Net Tons
FLAT ROLLED PRODUCTS:	
Plates (Sheared and universal)	3,101,981
Sheets	9,978,637
Strip	1,826,696
Hoops	72,971
Cotton ties and baling bands	34,580
Strip and sheets for cold reduced black plate and tin plate	2,662,193
Black plate	795,607
Total	18,472,665
BAR:	
Merchant	4,871,891
Concrete reinforcement	1,266,459
Total bars	6,138,350
Structural shapes	3,358,985
Sheet piling	158,296
Rails	1,312,647
Long splice bars, tie plate bars, etc.	519,075
Skelp	2,330,128
Blanks or pierced billets for seamless tubes	2,018,502
Wire rods	3,680,297
Car wheels (rolled steel)	148,382
Cross ties	14,692
Rolled forging blooms, billets and axle blanks	600,566
Blooms, billets, slabs and sheet bars for export	150,377
All other finished hot rolled products	100,594
Total	14,392,541
Grand total	39,003,556

Production of materials rolled from old material totaled 632,208 tons, of which the largest item was merchant bars amounting to 240,781 tons and the second largest was reinforcing bars totaling 216,666 tons.

Lincoln Once Repaired Worthington Pump Valve

• • • **One hundred years** of growth with American industry are described this week in an 82-page booklet issued by Worthington Pump & Machinery Corp., Harrison, N. J.

The founder of the company, Henry Rossiter Worthington, was the inventor of the direct-acting steam pump in 1840 when the United States had only 17,000,000 people, when the country was still primarily agricultural and when the pioneers were moving west.

During the Civil War, President Lincoln himself, according to Harry C. Beaver, now president of the company, took a monkey wrench in his large and greasy hand and helped fix a Worthington pump used for the water supply of the White House.

The New Jersey company now makes a long list of engineering products for all branches of the petroleum industry, for refrigeration and air-conditioning, and for steampower.

Stainless Steel In Planes Shown At Bolling Field

Washington

• • • **The many applications** of stainless steel in the aircraft industry were featured in the exhibit of United States Steel Corp. subsidiaries at the National Aviation Forum show held at Bolling Field, here, May 26-29.

At this aeronautical exposition, one of the most comprehensive ever seen in this country, was shown both civil and military equipment of the latest designs. Complete units, as well as engines and accessories and the materials used in connection with the manufacture of all types of aircraft and aviation equipment were on display.

In the U. S. Steel both were representative samples of stainless steel aviation products, such as sections of stainless steel airplane wings of the stressed skin type, exhaust manifolds, heaters, cowling, firewalls, shrouds, gasoline tanks, ammunition boxes and other fabricated articles made from stainless steel. Various types and sizes of stainless steel airplane cables and cords, as well as samples of the types and thicknesses of USS stainless steel strip and sheet were available for examination.

Stainless steel such as was shown in the United States Steel exhibit has been attracting attention of the aviation industry because of its attractive possibilities in safe and durable construction. Because of its high strength, lighter sections may be used and advanced design encouraged. It can be used in aviation equipment as it is delivered from the rolling mill without special heat treatment, which speeds up construction. Its ability to be spot welded quickly, safely and easily makes it particularly suitable for the mass production operations necessary to meet the rapidly increasing demand for planes that will stand up under the most severe service.

Even though stainless steel was featured at the U. S. Steel exhibit, the many other types and applications of steel in aircraft were also brought to attention. Airplane steel tubing is used extensively and has been specially developed for its particular use. Many aircraft designs today utilize steel tubing extensively in their framework and engine mountings.

HOW NEW PRODUCTS MAKE JOBS SHOWN IN MILWAUKEE

• • • **A survey of Milwaukee** industrial plants made recently by the Milwaukee chapter of the American Society for Metals showed how private industry is helping to reduce unemployment by developing better products and making more jobs.

This report cites development by A. O. Smith Corp. of a welding method that makes the weld stronger than the parent metal, by which large pressure vessels that will withstand tremendous strain are made possible for use in the manufacture of gasoline. Without these vessels, it was stated, the quality of today's gasoline would not be as high nor the cost as low.

Ampco Metal, Inc., which in 1932 employed only five men, now has 150 men working on the various alloys that have been developed by that company. Ampco, which is a pioneer in the centrifugal castings process, makes many parts for use by the aircraft industry.

Increased strength without additional weight was attained by the Falk Corp. through a process for heat treating large gears and castings for drive units. Falk is also developing a new type of clutch for marine service that is said to be able to reduce by half the time it now takes a vessel to reverse its direction by power.

The Sivyer Steel Castings Co. and the Wehr Steel Co. cooperated to cast steel sections for high speed army tanks from an alloy lighter and stronger than the steel previously used.

Metallurgists at the Chain Belt Co., the society report continued, developed an alloy and a process of heat treatment for cast iron that makes possible a concrete pump that cuts the cost of handling soft concrete.

By submerging metal in a silicon bath, the Globe Steel Tubes Co. has been able to attain an almost pure silicon case, which makes the metal extremely resistant to acid attack and according to the report is beginning to find use in automobile parts and in the oil industry. This company has also developed stainless steel tubes capable of withstanding 1400 deg. F. in the manufacture of high octane gas.

British Advance Scrap To Meet Higher Rail Rates

London

• • • **Maximum prices for** scrap iron and steel in the United Kingdom have just been increased under a Ministry of Supply direction in order to meet the recent increase in railroad charges.

For the manufacture of steel ingots, otherwise than in electric arc furnaces, prices are increased by 1s.6d. per ton for consumers in South Wales (West); by 1s. per ton for consumers on the Northwest coast and in Cheshire County (including Shotton), Brymbe and South Wales (East); by 6d. per ton for consumers in the Midlands (except for two grades of cast iron which are increased by 1s. per ton); and by 9d. per ton for consumers in all other districts.

All other grades of scrap are also increased by 9d. per ton.

Tower Heads Institute As Steel Men Prepare To Aid U. S. Defense

• • • **Departing from** its long-established custom of selecting as its president one of the executives of member companies, the American Iron and Steel Institute at its annual meeting last week elected Walter S. Tower as its first paid president. Mr. Tower has been executive secretary of the institute since 1933. He succeeds E. T. Weir, chairman of the National Steel Corp., who has been the institute's president during the past year.

The national defense program was said to be a factor in the decision of the institute's board of directors in adopting this new policy.

"The election of a paid president of the institute who will devote all his time to its affairs is regarded as the first official move by the industry in gearing itself to be in a position to cooperate in the fullest measure in the Government's huge national defense program," the institute's announcement said.

"The development of that program," the announcement continued, "is expected to place heavy demands upon the time of the chief executive of the institute in dealing with the problems of the industry and of relationships with other industries and with the Government. Moreover, the time and energy of each executive of the member companies will be fully occupied in their respective production problems. For that reason none of them would be able to find the time to guide the industry as president of the institute."

Mr. Tower has been associated with the steel industry since 1919 except for three years after the war when he was commercial attaché for the U. S. Department of Commerce at the American Embassy in London. Mr. Tower's first connection with the steel industry was with the former Consolidated Steel Corp., which represented a group of independent companies in export trade, and subsequently he was associated with the Bethlehem Steel Co.

B. F. Fairless, president of the United States Steel Corp., and

WALTER S. TOWER was elected president of the American Iron and Steel Institute to guide that organization in the difficult times ahead.

o o o

Frank Purnell, president of the Youngstown Sheet & Tube Co., were reelected vice-presidents.

The war in Europe naturally cast its shadow over the institute's meeting, held Thursday, May 23, at the Waldorf-Astoria Hotel, New York.

E. T. Weir, in his address as president, immediately stressed the ominous thought in everyone's mind as he said:

"Only one reason can justify war for America—jeopardy to the integrity and independence of the United States or invasion of this hemisphere.

"It is now of extreme importance that we, and all Americans, recognize clearly that America has one paramount interest to which all others are secondary. That is the preservation of the American way of life here in America.

"Preservation of the American ideals of life involves adequate preparation for effective defense. Whatever the outcome of the present war, the ruthlessness of its instigators has impressed upon us the necessity of thorough preparation for defense. With our unlimited resources, industrial power, and natural advantages, it is inexcusable that we are not better prepared at this moment. With all the warning we have had, why has the present Administration failed so glaringly to discharge one of the most vital functions of Federal Government—the provision of proper national defense?"

Mr. Weir declared that the present Administration also is "responsible for the country's weakened ability to meet an emergency in other ways than by neglect of direct military preparedness. It has placed the nation in the worst fiscal position in its history. Despite awareness of the dangerous international situation, the Administration continued its lavish domestic spending. It never stopped pouring billions down ratholes of political waste, social experimentation and so-called Government planning. Now we face the need for huge new expenditures with an already back-breaking burden of taxation and a Federal debt that has shattered the 45 billion dollar limit.

"Our industrial system must try to accept the monumental job that will be imposed on it by defense preparations under the handicaps that have been and are now imposed on it by governmental restrictions and interference. And, perhaps the most serious, this Administration is directly to blame for a disunity among the American people such as never existed before."

Saying that the steel industry will be of major importance in any program to prepare the country for defense, Mr. Weir called attention to some problems that hold "potentials of real danger," referring to the fact that seven of the 12 principal non-ferrous materials used by the steel industry come largely or entirely from foreign sources. He said that all steel companies have been preparing themselves against shortages of these materials, which include tin and manganesee ore.

Stating that the country needs $800,000,000 worth of such materials as adequate protection, Mr. Weir declared that only $13,000,000 had been expended by the Federal Government of the $100,000,000 appropriated by Congress under a four-year plan of accumulation of strategic materials.

In this connection he referred to steel scrap, declaring that in the interest of national safety a limitation should be placed on exports of this material.

Should the war continue, we may assume that exports of steel will greatly increase, said Mr. Weir. "Steel consumption of belligerents will multiply beyond their capacity to produce and neutrals will turn increasingly to the United States as the most important source of steel for their domestic requirements and for reexport.

Looking beyond the war, Mr. Weir said that we may expect an aftermath of world prostration. The belligerents will have to reestablish themselves in world markets and "they may be expected to fight savagely with economic weapons to recapture customers lost to neutrals during the war."

Declaring that the physical condition of the steel industry is the best in its history, Mr. Weir contrasted the "efficiency of management on the operating side and its accomplishments on the commercial side." He asserted that "If our production methods over the past few years had descended to the level of our merchandising methods, steel would have no competition for the title of the worst managed industry in America.

"Ours is an industry," he continued, "in which the products are fairly well standardized and the price set by one producer is generally met by the others. Of course, no one consciously started to initiate a period of unprofitable business. The manufacturer no doubt thought that by making a concession he would bring his company an immediate advantage and that it would not go any further. . . . Experience of the last few years has shown that this type of competition has not helped any of the companies. The advantage of the one who initiated it was shortlived at best. It was only a little while until the prices which he established became the prices for the industry and by the time a wave of price reduction traveled through the industry and returned to its initiator, he found himself in the position of having to take business on a below-cost basis. The final result was that the entire industry got to operating below cost. This, no one can justify—it is always a destructive practice.

ERNEST T. WEIR, chairman, National Steel Corp., blames the Administration for the country's weakened ability to meet a (war) emergency.

o o o

FRANK PURNELL, president, Youngstown Sheet Tube Co., says the steel industry has no immediate expansion problem despite the nation's defense needs.

"In these days of large-scale business organization, decisions of an individual company are not restricted to that company in their effect. They extend their influence beyond the individual company throughout its industry and eventually affect all industry. This imposes a heavy responsibility on all management. Policies should be set with full understanding that this is the industrial situation today. Some particular course of action may seem to hold a very tempting advantage to a particular company, but if the action is unsound in principle, it inevitably will break down the structure of the industry and in the process more than cancel any original advantage. . . . We all know that in our industry there is very quick communication of information of this kind. Both buyers and sellers of steel are very alert. There are no merchandising secrets, though some of us may have been inclined to think so. Therefore, I urge that every major decision must be made only after thorough consideration of its effect on our entire industry."

Mr. Weir took the occasion to refute statements that technological improvement in the steel industry has added to total unemployment. While he said it was true that there had been some dislocations, for which the industry recognizes its responsibilities, he said that the facts show that steel employment as a whole has greatly increased. In the three years 1927-1929, which were a period of high steel production, there was an average of 401,600 workers, while in the past three years the average was 441,400, an increase of nearly 40,000.

"There would be no unemployment problem in the United States today," he declared, "if all lines of employment had advanced propor-

tionately with the steel industry."

The financial problems of the steel industry were discussed in a paper by Frank Purnell, president of the Youngstown Sheet & Tube Co., who summarized the main problems as follows:

"Tremendous sums invested in raw material reserves, plant and equipment.

"Extensive outlays required for improvements and for keeping production facilities modern and efficient.

"Necessity for large working capital because of large amounts of receivables, heavy inventories and demands for cash funds.

"Large provisions necessary each year for depreciation and depletion.

"A pronounced decline in profit and return upon capital investment which has taken place in the industry during the last 20 years."

Other facts about the industry presented by Mr. Purnell were: More than 70 per cent of the total assets of the industry are represented by plants, property and raw material reserves, as compared with an average of about 45 per cent for other manufacturing industries; in the period from 1935 through 1938 some 30 companies, representing over 88 per cent of the steel-making capacity of the country, expended $794,000,000 for construction of new facilities; there are more than 500,000 shareholders in the various steel companies who received $202,193,000 in dividends in 1929, but in 1933 got only $14,500,000 and in 1939 approximately $70,000,000; in the four years 1927-1930 new common stock issues of steel companies approximated $475,000,000 while in the nine years that followed the total of such issues was only $18,000,000.

"In order to attract venturesome capital, there must be a definite improvement in earnings for the industry," Mr. Purnell said. Taxes are a serious problem. Last year's total tax bill of 89 companies, he said, was $141,123,000, while the same companies had total net earnings of $140,394,000.

The national defense program, it was stated, will place upon the steel industry new obligations for the production of the material required. "Should these demands so increase as to burden the capacity of the industry over a long period, the necessity for new capital expenditures naturally would arise," said Mr. Purnell. "However, for the present at least, the industry is prepared to meet any emergency, and there is no immediate expansion problem."

What Steel Leaders Say

• • • "It is now of extreme importance that we, and all Americans, recognize clearly that America has one paramount interest to which all others are secondary. That is the preservation of the American way of life here in America." ERNEST T. WEIR.

* * *

"In order to attract venturesome capital there must be a definite improvement in the earnings for the (steel) industry." FRANK PURNELL.

* * *

"I have never heard of a time when we, as buyers of steel from all producers over a period of 98 years, were unable to find evidence of active and keen competition among those who were willing and anxious to sell the steel products we bought." EDWARD L. RYERSON, JR.

One of the most unique addresses that has been delivered at a meeting of the American Iron and Steel Institute was that presented by Edward L. Ryerson, Jr., who recently became chairman of the board of the Inland Steel Co., Chicago. It was unique in the fact that Mr. Ryerson is probably the outstanding example of a former large buyer of steel products who is now on the other side of the fence as a leading producer. The effectiveness of Mr. Ryerson's comments was enhanced by the fact that he spoke first as a buyer of steel products, basing his remarks on many years' experience as head of Joseph T. Ryerson & Son, Inc., warehouse distributer, now a part of Inland Steel Co., and second as a steel producer.

Going back to his experience as a buyer, he said:

"As a buyer of steel I have not been greatly concerned with what it cost you to make the products I needed as long as your price permitted me to resell or use those products in a way that allowed me to show a good profit. Therefore, I used every possible honest method to get my goods at the lowest price at which you were willing to sell them. Of course, I tried to make my specifications attractive so that there might be as much competition as possible among you to fill my orders. That's good commercial practice for any buyer. When extras were charged for special grades or quantities I complained, and usually succeeded in offering enough inducements of annual requirements, or some other attractive feature about the order, to persuade you to reduce or waive the extras. So-called 'extras,' were interpreted by me, a buyer, as something beyond the reasonable normal price of the goods anyway. All such policies seemed like good, healthy competition, at least from the buyer's viewpoint.

"The amazing thing about this steel industry is that in spite of such competition having prevailed through all the years, the general public seems to have been convinced, and still believes that somehow or other the industry is controlled and dominated by a small group who, by some process of collusion or agreement, fixes the price and sets up a monopoly which seriously interferes with free competition and thereby increases the cost of steel products so that the public consumption of goods is restricted.

"Until this prevailing opinion can be changed, the steel industry must continue to carry the bad reputation that it seems to have had for many years. Perhaps there were times, in the early development of the industry, when commercial policies of a doubtful nature existed, just as there have been other policies dealing with management, finance, and labor relations that were not in keeping with what we now consider to be for the best interests of the consumer, the stockholder, and the employee.

"However, if I cannot do anything else by appearing before you today, I hope that, at least, I may serve as a well-informed witness to testify to the public

that I have never heard of a time when we, as buyers of steel from all the producers over a period of 98 years, were unable to find evidence of active and keen competition among those who were willing and anxious to sell the steel products we bought.

"I did not say intelligent competition, but it certainly was competitive in the true sense, even as defined by the law of our land and the dictionary. The lack of intelligence in your competitive policies was not, by any means, always advantageous to us, the buyers. We heartily dislike the dangers inherent in carrying inventories that may shrink drastically in values due to your published announcement of lower prices to meet temporary trends of competitive action.

"We watch, with suspicion and distrust, the tendency to offer our customers the advantages of the service we furnish without your demanding reasonable compensation for that service. We see the absorption by you of good customers, as well as sources of supply, and wonder as to the opportunity for the development of independent steel consuming business of all kinds.

"On the other hand, we welcome the opportunity to take advantage of your generous policy of accepting large tonnage commitments in advance of any contemplated increase in price while, at the same time, permitting us to cancel any obligations if the price is lowered and even going far beyond our expectations at times by making such reduced prices apply on tonnage previously placed. Some buyers and some economists think the basing point system of pricing should be eliminated, but we accept the fact that some such method is essential to maintain a simple and equitable plan for pricing standardized steel products for competitive areas. We are indebted to the officials of United States Steel Corp. for their comprehensive presentation of this difficult question at the TNEC hearings. No one has, as yet, suggested a method of pricing steel products which would promote the general welfare in so far as it relates to consumer, buyer, and seller, better than the present basing point system. As customers, we accept that viewpoint

EDWARD L. RYERSON, chairman, Inland Steel Co., declared that the steel industry somehow or other "does lack commercial intelligence."

o o o

and recommend that the endless discussion of the subject be dropped, at least until some better plan is recommended."

As a steel producer Mr. Ryerson said he had learned some things on the other side of the picture.

"If my statements as a customer were correct," he said, "we should be gratified to know that our competitive spirit is so aggressive and we must feel that we are not subject to any immediate danger of indictment by the courts for restraint of trade. We should, however, be convinced that our commercial policy is not very intelligent. . . .

"If we analyze the showing of our steel industry, you know well what we will find, but it is worth repeating here to convince ourselves that somehow or other we do lack commercial intelligence."

Mr. Ryerson thought it might be the "fear complex" which prevents steel companies from obtaining a "fair price" for their products. "Until we can convice ourselves, as well as our customers, of the necessity of selling our goods at a fair price we cannot expect to show any real improvement in the returns to our stockholders. . . .

"The only answer to avoid being stupid in business is to use intelligent common sense, combined with honest dealings. Others have spoken to you on this subject before. They have pleaded with you. They have scolded you. It is not for me to do either of these. All I will say, as a customer or a producer, is that if we continue having the unintelligent policies we are all familiar with and persist in these so-called 'bargain sales' of our products, it seems to me that before long we will have 'bargain sales' of our plants."

James E. Lose, vice-president in charge of operations of the Carnegie-Illinois Steel Corp., was the recipient of the Gary medal, which is presented each year for the outstanding technical paper at the previous meeting. The presentation was made at the evening dinner, at which the speaker was Governor Raymond E. Baldwin of Connecticut.

Technical papers presented were:

"The Control of Steel Composition and the Problems it Presents," by Earl C. Smith, chief metallurgist, Republic Steel Corp.

"Dimensional Variations in Rolled Steel Products," by A. C. Cummins, general superintendent, Youngstown district, Carnegie-Illinois Steel Corp.

"Producing Steel to Meet Physical Test Requirements," by C. H. Herty, Jr., research engineer, Bethlehem Steel Co.

An industrial relations discussion took place in question and answer form under the chairmanship of George T. Fonda, assistant to the president, Weirton Steel Co.

Britain Will Get 15% of Dominion Steel's Output

Toronto

• • • Arthur Cross, president, Dominion Steel & Coal Corp., Sydney, N. S., said arrangements have been completed whereby British interests have contracted to take approximately 15 per cent of the company's ingot output. The company has completed installation of its two new open hearth furnaces, and these now are in operation, bringing steel production at the Sydney works to approximately 600,000 tons per year, an increase of about 30 per cent over the previous capacity.

More Companies Represented at Gear Meeting Than Ever Before

• • • **In point of** number of companies represented, the 24th annual meeting of the American Gear Manufacturers Association, held last week at the Grove Park Inn, Ashville, N. C., broke all previous records. Except for one paper relating to trends in gear sales, all the papers presented at the three-day sessions on May 20-22 were technical in character and the attendance was largely composed of top engineering officials of the member companies. Two proposed recommended practices were adopted at the meeting, one relating to methods of inspection and to tolerances of spur and helical gears, the other to the lubrication of industrial gears. A preliminary draft of recommended practice on lubrication of open gear was submitted to the group for discussion and criticism.

The meeting opened on Monday morning, May 20, with a brief address by Charles F. Goedke, president of the association and president of the Ganschow Gear Co., Chicago. Then following progress reports by various technical committee chairmen, two technical papers were presented, one on the production of fine pitch gears, the second the use of boring mills in a gear shop. In the evening, W. L. Schneider, sales manager of the Falk Corp., discussed the ups and downs of gear sales since 1928. He showed several charts, one of which is reproduced with this article, correlating gear sales with other trends such as automobile production and steel ingot output. One chart indicated that from 1928 to 1937 there was a very close correlation between the market highs of General Motors stock and gear sales. The effect of the 1937 strikes on General Motors destroyed this parallelism of movement and the stock market trend has failed to reflect the sudden bulge in gear business since last September.

On Tuesday and Wednesday mornings, technical papers were read relating to roller and gear pitting tests, tooth bearings in bevel gears, diesel and gas engine load characteristics as related to their effect upon the gear sets through which they drive, and an informal talk was given on gear trouble-shooting over a period of 38 years. D. W. Diefendorf, vice-president, Diefendorf Gear Corp., Syracuse, was chairman of the program committee.

U. SETH EBERHARDT, vice-president, Newark Gear Cutting Machine Co., was crowned (literally) president of the American Gear Association.

o o o

At the banquet on Tuesday evening, amid much humorous ceremony, the newly elected officers were installed. The crown of the presidency was placed on the head of U. Seth Eberhardt, vice-president of the Newark Gear Cutting Machine Co., Newark, N. J., and W. P. Schmitter, vice-president and chief engineer of the Falk Corp., Milwaukee, was installed as vice-president. R. S. Marthens, manager of the Nuttall Works of the Westinghouse Electric & Mfg. Co., Pittsburgh, was reelected treasurer, and J. C. McQuiston continues as secretary. Allan H. Candee, Gleason Works, Rochester, N. Y., was elected to the executive committee, as were W. A. Barr, president of Foote Brothers Gear & Machine Corp., Chicago; R. C. Ball, president of the Philadelphia Gear Works, and F. B. Drake, president of the Johnson Gear & Mfg. Co., Berkley, Cal. Mr. Goedke, retired as president of the association following the election of Mr. Eberhardt.

The dinner speaker was George F. Nordenholt, editor of *Product Engineering*, who warned against possible national legislation restricting the development of new products. He cited examples of many new industries like aircraft and radio that had created new jobs in the last 25 years.

R. S. MARTHENS, manager of the Nuttall works, Westinghouse Electric & Mfg. Co., was chosen as treasurer of the Gear Association at the Asheville meeting.

o o o

In a paper reviewing the place of the boring mill in the gear shop, E. Payson Blanchard, sales manager of the Bullard Co., indicated that the so-called vertical turret lathe, really a boring mill, had inherent advantages over a horizontal chucking machine when the weight of the forging or casting was greater than what an operator could comfortably hold in one hand. Selection of the means of gripping the work is a most important problem, as the work should be gripped in such a way that the machining of the blank may be accomplished in the fewest possible handlings and operations, not only to save time but also to maintain

accuracy. Should it be necessary to turn the blank over to finish it in a second operation, the use of soft jaws and floating jaws has been found particularly desirable.

In the latest type of boring mills, vertical and horizontal feed of the tool heads may be combined so as to give a component angular direction to the tool feed. After cutting in one quadrant, it is possible to reverse the feed and come back in a second quadrant. Contours on torpedo casings are being machined in such a way. Production in general on this new machine is 20 to 35 per cent greater than on older types.

Mr. Blanchard also indicated that multiple spindle Mult-Au-Matics are being widely used in turning out gear blanks in lots ranging from 40 to 75 pieces. To reduce the set-up time to a minimum, block tooling is used and the tools are set to a finished piece rather than to gages. Here again,

W. P. SCHMITTER, vice-president and chief engineer, Falk Corp., Milwaukee, was elected vice-president of the Gear Association at the 24th annual gathering.

o o o

soft jaw chucks have been found most advantageous. On small lots, use of bar stock cut to length in a power saw is much more economical than forgings, Mr. Blanchard said, even though a large amount of stock must be removed.

A second progress report on gear pitting tests being carried on for the past several years at the Westinghouse research laboratories was given by Dr. Stewart Way. In these tests, a study is being made of the various factors relating to the fatigue failure of gear tooth surfaces resulting from repeated stresses during rolling and sliding action. At the same time in order to isolate the variables, tests have been conducted on the fatigue life of steel rollers of various analyses, physical properties and diameters when rotated against one another under load. The present report was largely intended to correlate the roller test data with a few tests carried on with gears themselves.

Doctor Way showed charts indicating a close correlation between pitting resistance and the Vickers hardness numbers. In general for the test rollers, pitting resistance increases a little more rapidly than hardness, while for gears the increase is proportionate. No effect is noted if the mating roll is of a different hardness. The pressure in both instances tends to work harden the surfaces.

Surface finish influences the pitting resistance of roller specimens to a considerable extent, but the effect on gear teeth is less since

J. C. McQUISTON continues as secretary of the Gear Association which, on May 20-22, drew representatives of more companies to its convention than ever before.

the considerable sliding action present tends to smooth the surfaces.

On gears, however, pitting is promoted when the sliding action is in an opposite direction from rolling action (i.e., when contact is below the pitch line), and since this is the area in which there is usually a single tooth in contact (and hence higher specific loads), most gears pit first below the pitch line. On the other hand, due to profile errors and other factors, the number of pits on a gear or pinion increases more gradually with increases in load than in the case of rollers.

The field for fine pitch gears has been increased by the introduction of products such as motion picture cameras and projectors, recording devices, range finders, etc., calling for tooth forms quite different from those in use in the watch industry. Douglas T. Hamilton, publicity manager of the Fellows Gear Shaper Co., told of some of the new tools and machines recently developed for this type of gear cutting. He illustrated gap type shaper cutters that permitted two blanks to be finished at once, loading taking place in the two gaps in the circular cutter. The cutting teeth may be made up of one or two stages of roughing teeth and a final stage of finishing teeth. Rack type cutters are made much in the same way.

Two types of machines have been designed for this class of work, the one employing the rack type cutters being known as the straight line gear generator, the other being known as the fine pitch gear shaper. Both types can be equipped with automatic blank loading devices for high production work. In each, the cutters can be reciprocated up to 2000 strokes per min.

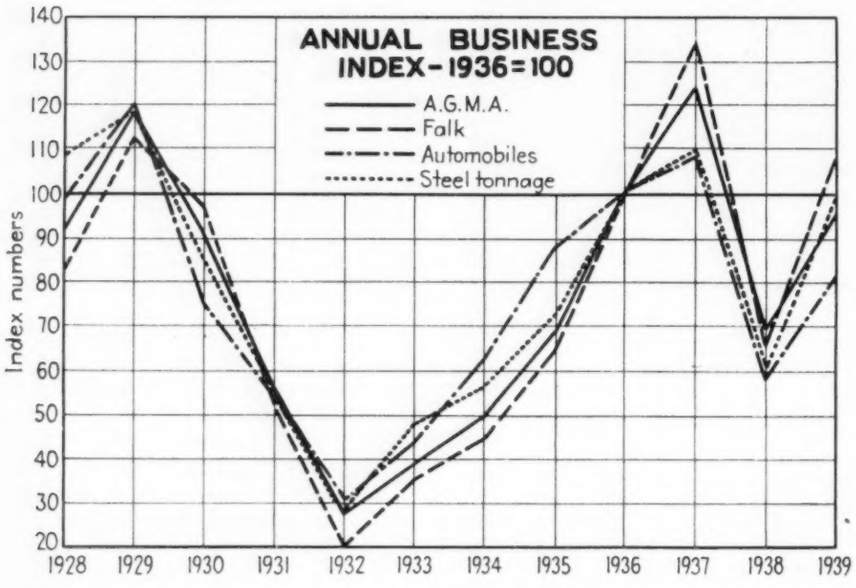
The principal problem in small gear work is holding and driving the blanks, and the larger part of Mr. Hamilton's paper was devoted to illustrations of typical holding fixtures for this class of work.

A new conception of tooth bearing surfaces in bevel gears was presented by Allan H. Candee, gearing engineer of the Gleason Works. Tooth bearing he defined as the total effect or area covered by

successive positions of the instantaneous line of contact. Mr. Candee illustrated by numerous charts how the tooth bearing on bevel gears could be changed in width, height and position by modifications of the cutter setting and in the mounting position of the gear set in actual service.

In this connection, it was brought out that spiral bevel gears are much less sensitive to axial displacement of the pinion vertically than are straight bevel gears. Both types, however, are relatively insensitive to axial displacement of the pinion from theoretical position.

In practice, it is always desirable to have the tooth bearing over only a part of the teeth, obtained by modifications or relief on the tooth curvature. A very direct indication of the amount of difference in lengthwise curvature of mating tooth surfaces is the vertical displacement necessary to change the tooth bearing from one end of the tooth to the other. In order to keep the bearing at the middle of the tooth height, however, it is necessary to combine a horizontal displacement with the vertical when the adjustment is made on the test stand. This kind of a determination is known as the V and H check. In spiral bevel gear practice it is common to make gears meet a specified V and H check within a tolerance of 0.002 to 0.003 in., although the total displacements may be in the nature of 0.018 in., in order to shift the bearing from one end of the tooth to the other. The V and H check gives an accurate measurement of the amount of modifications actually made and gives a good idea of the latitude available in mounting adjustments to obtain the type and location of tooth bearing desired.



IN a paper entitled "How's Business?" W. L. Schneider, sales manager of the Falk Corp., compared the monthly sales of his company with the A.G.M.A. gear sales index and correlated the two with the production of automobiles and steel ingot production. As the chart indicates, if 1936 is made the index of 100, the correlation is extremely close. (Actually, the A.G.M.A. index as issued is based on 1928 = 100 and has been converted to the 1936 base.) The A.G.M.A. index of gear sales is published monthly in chart form in THE IRON AGE, the last chart having appeared in the May 23 issue on p. 104.

In a paper filled with pithy expressions and subtle humor, A. A. Ross, manager of the gear department at General Electric Lynn Works, recounted some of his experiences with gears since he first worked with them in 1902. Reviewing all the gear tooth forms he had met in the interim, he mentioned such unorthodox forms as the "wisdom" tooth, which turned out to be the progenitor of the long addendum tooth. Throughout his paper, Mr. Ross kept emphasizing that what counted most as regards silent operation and long life was the number of teeth in contact, which he set at a minimum of two or more. Summarizing, he recommended as the best tooth form for spur gears, a full depth tooth of either 14½ or 20 deg. pressure angle—whichever one would give the maximum number of teeth in the arc of action without undercut. For the single helical or herringbone type, his ideal gear would have an addendum based on full depth normal circular pitch, but not less than 14½ deg. normal pressure angle, with a helix angle from 23 to 30 deg. and a pressure angle in plane of rotation between 18 and 20 deg.

Special operating conditions for gear sets driven by diesel and gas engines were reviewed in considerable detail in a paper prepared by Austin Kuhns of the Farrel-Birmingham Co., Inc., and read in his absence by P. A. Manger, chief engineer of the Buffalo plant of that company. Since harmful vibrations, particularly of a torsional nature, may be transmitted from the internal combustion engine to the gear set, a large part of Mr. Kuhn's paper was devoted to a description of various couplings in use that have vibration damping characteristics.

Particular emphasis was placed on the Airflex coupling, built on the principle of the multiple ply automobile tire. Several types of hydraulic clutches and couplings were described, including the Vulcan hydraulic clutch, which has proved very reliable. Electric air gap clutches were also analyzed.

Before closing the meeting, the association formally pledged its support to the national defense program now being undertaken by the United States Government.

Government Orders For Week $640,076

• • • **Federal contracts** for iron and steel products, as reported by the Labor Department's Public Contracts Division for the week ended May 18 totaled $640,076. Contracts for non-ferrous metals and alloys and machinery for the same period amounted to $135,220 and $692,587, respectively. Details follow:

Iron and Steel Products:

Blaw-Knox Co., Pittsburgh, antenna towers, $56,000; C. T. Patterson Co., Inc., New Orleans, La., dredge pipe, $20,076; Collins Concrete & Steel Pipe Co., Portland, Ore., culverts, $11,468; Judson Steel Corp., Oakland, Cal., reinforcement bars, $10,882; National Tube Co., Pittsburgh, steel forgings, $46,923; Bethlehem Steel Export Corp., New York, structural steel, $92,316; Columbia Steel Co., Seattle, steel, $13,155; United States Steel Export Co., Washington, D. C., structural steel, $200,027; Walter Kidde & Co., Inc., New York, seamless steel cylinders, $16,173; Pollak Mfg. Co., Arlington, N. J., ammunition boxes, $16,500; American Chain Division of American Chain & Cable Co., Inc., York, Pa., chains, $31,945; Crucible Steel Co. of America, New York, steel rod, $16,953; Widin Metal Goods Co., Garwood, N. J., machine gun mounts, $50,197; Carnegie-Illinois Steel Corp., Washington, D. C., steel forgings, $46,358; Bethlehem Steel Co., San Francisco, reinforcement bars, $11,-100.

Non-Ferrous Metals and Alloys:

Baker & Co., Inc., Newark, N. J., gold solder, $13,130; American-LaFrance-Foamite Corp., Elmira, N. Y., fire extinguishing system, $16,870; Scovill Mfg. Co., Waterbury, Conn., brass, $12,441; Scovill Mfg. Co., Waterbury, Conn., condenser tubes, $52,-903; The Riverside Metal Co., Riverside, N. J., 1c. blanks, $39,875.

Machinery:

Caterpillar Tractor Co., Peoria, Ill., tractor and grader, $15,224; Caterpillar Tractor Co., Peoria, Ill., crawler tractors, $29,147; R. G. LeTourneau, Peoria, Ill., scrapers, $12,689; Chapman Valve Mfg. Co., Indian Orchard, Mass., valves, $16,010; Hamilton Tractor & Equipment Co., Chattanooga, Tenn., tournapulls, $49,990; Allis-Chalmers Mfg. Co., Milwaukee, turbines and governors, $367,280; Chain Belt Co., Milwaukee, concrete-pumping machine, $23,263; Manning, Maxwell & Moore, Inc., Bridgeport, Conn., relief valves, $22,008; DeLaval Steam Turbine Co., Trenton, N. J., pumps, $48,095; Manning, Maxwell & Moore, Inc., Bridgeport, Conn.

THE CABLE KING HOIST BRINGS YOU ALL THESE FEATURES:

1. Air-cooling
2. Lifetime gearing
3. "Precision" type bearings
4. Self-adjusting load brake
5. Heavy duty motor brake
6. Weather-proof motor
7. 30 Minute motor rating
8. One point lubrication
9. Large diameter drum
10. Upper limit stop
11. Safety bottom block & hook
12. All-weather controllers
13. Ribbed steel hoist frame

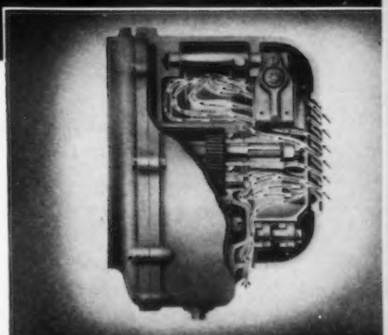
These features make the Cable King the electric hoist that meets *all* specifications engineers demand. A proved hoist . . . it's proved by exhaustive laboratory and field tests.

Air-cooling, an exclusive Cable King feature, eliminates excess brake heat, and enables the Cable King to operate on a heavier duty cycle than any other hoist in the same class. It accomplishes more in a given operating hour, which means greater savings.

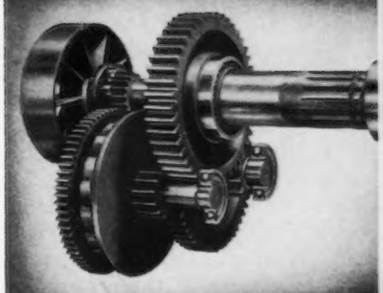
Another Cable King feature is Yale precision construction. All gears and pinions are drop-forged, chrome nickel steel, heat treated for maximum wear and long life. And the bearings at *all* friction points are "precision" ball or roller type, specially sheathed and shielded from dust.

These are only a few of Cable King's exclusive features. Ask your Yale distributor to tell you about *all* of them. Or write direct to us for descriptive catalog.

Capacity ¼ to 6 tons.



AIR-COOLING



LIFETIME GEARING

PRECISION TYPE BEARI

THE YALE & TOWNE MFG. CO.
PHILADELPHIA DIVISION, PHILADELPHIA, PA., U. S. A.
IN CANADA: ST. CATHARINES, ONT.

YALE

Makers of Yale Hand Chain Hoists, Electric Hoists, Electric Industrial Trucks, Hand Lift Trucks and Skid Platforms.

"Know Your Employees"—Keynote Of 42nd Metal Trades Convention

• • • **In the midst** of the sudden interest being focused on the productive ability of the nation's metal-working plants by the rearmament program, 250 members of the management personnel of a large number of these plants gathered in New York last week to study some of the problems involved in operating these vital plants. The occasion was the 42nd annual convention of the National Metal Trades Association.

The keynote of the meeting, better understanding of the problems faced by both the employee and the employer, was sounded by William A. Carson, Sunbeam Electric Mfg. Co., in an address at the opening day's meeting.

"It is evident," Mr. Carson said, "that today labor relations must assume equal rank with production, sales and finance in the minds of management." Plans to improve employer-employee relations should be "developed on the basis that the interests of the employer and the employee are inseparably mutual and that friendly cooperation is the only means by which progress can be made."

Much of the industrial progress that has been made in this country, Mr. Carson pointed out, may be attributed to the scientific approach to problems of production, distribution and consumption, and a successful, practical labor relations program must also be based upon a scientific approach. Discussing phases of the program in operation at the Sunbeam plant, Mr. Carson noted that it was their practice to take employees into the management's confidence and tell them frequently the condition of the business and the problems facing management.

Several years ago the company installed a public address system with 26 loudspeakers, at least one speaker being located in every department of the plant. Music and announcements of recreational or other employee activities are broadcast over this system during lunch periods.

On an average of once every two months a talk to employees is made by some executive of the company, generally from a platform in some department of the factory in view of several hundred workmen. Other workers in distant parts of the buildings hear the speech through the loud speaker system.

N. W. PICKERING (top), Farrel-Birmingham Co., Inc., said the raising of U. S. living standards is up to management.

A. H. TIMMERMAN (below), Wagner Electric Co., is the new president of the National Metal Trades Association.

o o o

Increases or decreases in production schedules, changes in work schedules, Sunday work, overtime work, new model introductions, announcements of vacation plans and bonus plans are the subjects of these talks.

Fundamentally, Mr. Carson thought, labor relations is a matter of leadership. If management fails to provide the proper type of leadership it has no right to criticize others who may be misleading the men, he said.

Stabilization of employment is the biggest and most pressing problem facing management today, Mr. Carson stated. Sunbeam's business, electric refrigeration, is highly seasonal, yet the company had made surprising progress toward providing stable employment, he pointed out. Factors cited as tending to stabilize employment are building of inventories in advance of the selling season and making extensive repairs and re-arrangements in the off-season.

A similar thought was expressed in the report of the retiring president of the association, N. W. Pickering, Farrel-Birmingham Co., Inc., "There is no problem in the manufacturing industry where adherence to sound principles is more important than in the field of employer-employee relations," Mr. Pickering said. The problem of raising the standard of living of American people is one that rests with management, and management alone. Events over the past years, unsuccessful experiments in attempting to legislate higher standards, have made this increasingly clear, he said.

"Let us be realistic about it," the retiring president insisted. "We cannot, as leaders of industry, abdicate our inherent responsibility even if we would. Regardless of how difficult our jobs become, regardless of whether remedial legislation industry feels is necessary is enacted, or confidence revived, we must still carry on."

At the business meeting on Wednesday, A. H. Timmerman, Wagner Electric Corp., St. Louis, was elected president of the association to succeed N. W. Pickering, Farrel-Birmingham Co., Inc. Roe S. Clark,

Package Machinery Co., Springfield, Mass., was chosen first vice-president, and H. H. Kerr, Boston Gear Works, Inc., North Quincy, Mass., was elected second vice-president and treasurer.

New councillors selected were:

Ralph H. Illingworth, Boston Machine Work Co., Lynn, Mass. D. P. Sommer, Keystone Steel & Wire Co., Peoria, Ill. Arthur E. Blackwood, Norton, Lasier Co., Chicago. George A. Seyler, Lunkenheimer Co., Cincinnati. T. H. Doan, Foote-Burt Co., Cleveland. R. W. Gillispie, Jeffrey Mfg. Co., Columbus. S. Owen Livingston, Gallmeyer & Livingston Co., Grand Rapids, Mich. A. E. Newton, Collins Co., Collinsville, Conn. N. R. Knox, Bucyrus-Erie Co., South Milwaukee, Wis. R. G. Wilson, Challenge Machinery Co., Grand Haven, Mich. J. L. Kopf, Jabez Burns & Sons, Inc., New York. Ernest Dunford, Landis Machine Co., St. Louis. D. Norris Benedict, Frick Co., Waynesboro, Pa. N. W. Pickering, Farrel-Birmingham Co., Inc., Ansonia, Conn. W. F. Newhouse, Saranac Machine Co., Benton Harbor, Mich.

Meeting the Labor Shortage

• • • For some time the National Metal Trades Association has been active in encouraging foremen and apprentice training plans. In the spring of 1939, the developing shortage of skilled labor was foreseen and a special committee was appointed to intensify the training of skilled workers.

The association's efforts to meet the skilled labor shortage has followed two general lines. The first has been the encouragement of more intensive and extensive apprentice programs. The second activity has been development of specialized training programs for machine operators. Efforts to expand apprentice training programs are supplemented by assistance to vocational schools in arranging studies to fit the specific needs of industry.

The training of a good, all-around mechanic, requires at least from three to four years, while a man can be trained to operate a certain type machine in from two to three months.

Another interesting feature of the Tuesday afternoon program was a panel discussion of employer-employee relations, with the following participating: G. W. Cannon, Campbell, Wyant & Cannon Foundry Co.; Col. J. B. Dillard, Cleveland Twist Drill Co.; A. L. Frost, Sargent & Co., New Haven, Conn.; A. W. Hawkes, Congoleum-Nairn, Inc.; H. H. Kerr, Boston Gear Works, and N. R. Knox, Bucyrus-Erie Co.

Other speakers at the convention included Prof. J. Anton de Hass, Harvard University; A. S. Redway, Farrel-Birmingham Co., Inc.; Howard Goodman, Goodman Mfg. Co.; J. R. Murphy, commander, American Legion; A. S. Davis, Dexter Folder Co.; H. M. Hubbard, Harris-Seybold-Potter Co.; Phil Hanna, editor, *Chicago Journal of Commerce*, and Carl Taylor, executive secretary, Wisconsin Building and Loan League.

Raymond E. Baldwin, Governor of Connecticut, was the principal speaker at the annual dinner on Tuesday evening.

Latest Census Lists 1391 Canadian Factories in Iron and Steel Group

Toronto

• • • **Production of iron** and steel products in Canada for 1938 had a total value of $548,801,929, which is 12.2 per cent below the total for 1937, but higher than for any other year since 1930, according to the census of industry, compiled by the Dominion Bureau of Statistics, Ottawa. Substantial declines during the year were reported in 13 of the 17 industries represented in the group.

In 1938 a total of 1391 factories were included in the iron and steel group, which represented capital of $657,304,274, and gave jobs to 121,235 workers who were paid $154,459,640 in salaries and wages during the year. Materials used in manufacture cost $272,544,238 and fuel and electricity cost $14,618,557.

Canada's imports of iron and steel products were valued at $162,554,216 in 1938, 23 per cent under 1937. Purchases from the United States, amounting to $134,844,204, accounted for 83 per cent and imports from the United Kingdom, valued at $21,640,236, made up 13 per cent.

The following table shows the number of plants and value of products made in 1937 and 1938:

	1937		1938	
Products	*Plants*	*Production Value*	*Plants*	*Production Value*
Pig iron, ferroalloys, steel and rolled products	55	$74,580,669	55	$59,606,150
Iron castings and steel forgings	231	41,913,753	230	35,460,962
Heating, cooking apparatus	68	15,976,018	68	14,069,018
Boilers, tanks and engines	54	11,211,501	55	10,840,220
Farm implements	37	18,961,394	38	21,299,185
Machinery	214	57,096,816	213	48,272,442
Automobiles	15	134,810,280	12	116,746,239
Automobile parts	88	46,631,643	97	36,980,424
Bicycles	4	1,882,668	4	1,767,538
Aircraft	8	1,730,724	13	6,927,105
Shipbuilding	40	10,360,686	41	11,171,416
Railway rolling stock, repairs	37	93,854,555	37	80,977,701
Wire, wire goods	75	23,558,635	77	20,605,207
Sheet metal products	148	49,132,766	169	46,266,684
Hardware, cutlery and tools	148	22,464,718	151	19,085,007
Bridge, structural steel	19	16,850,324	21	14,817,901
Miscellaneous iron and steel	104	3,802,727	110	3,908,730
Total	1345	$624,819,877	1391	$548,801,929

Steel Warehousemen Criticize Some Policies of the Mills

• • • **Steel mills** as a whole have no policies to govern constructively their relationships with distributer customers, Walter S. Doxsey told the American Steel Warehouse Association at its two-day session at the Hotel Plaza, New York.

The association official said that with very few exceptions, the steel warehouses must pay the same price for the steel they buy from the mills as the customers to whom they must resell their merchandise. And further, the steel distributer must contend with a "weird and fascinating array" of mill item extras, order extras, less-carload extras, and a perplexing combination of all these, which may help him in some instances and seriously handicap him in others.

"The warehouses have long arrived at their resale prices of many steel mill products by adding to the mill base prices the transportation charges and various spreads, margins or service charges. Mill extras for size, quality, chemistry, finish, etc., are also added. If an extra is paid by the warehouse to the mill for quantity, it is not reflected in any form or manner in the warehouse selling price. Therefore, the minimum quantity or weight of an item to which the mill base price applies becomes a matter of much significance to the steel distributer.

Illustrating by a series of charts what he declared are "a grotesque array of mill quantity and item extras," Mr. Doxsey analyzed the situation with respect to a number of steel products.

There is very little criticism of the item quantity extras on cold rolled strip, he said, wherein the base price applies on quantities of 6000 lb. or over. On stainless steel, he said that the base quantity of 40,000 lb. is a considerable amount in a product so high priced and is out of the reach of the warehouse. However, he added that this schedule seems to be working out satisfactorily and "the distributer is not too often harassed by direct mill competition for items of less than 2000 lb." The schedule for cold finished carbon and alloy bars was said to represent "the greatest degree of mutual and sympathetic understanding between producer and distributer." In this product the base price applies to items of 20,000 lb. and over; a deduction is granted on items of 40,000 lb. or more of carbon bars, but no quantity discounts are given on the alloy bars. These extras and deductions, it was said, "make it possible for the distributers to compete with producers for items of cold finished bars up to 1500 lb."

Compared with the simple item extras applied to cold rolled strip, stainless sheets and cold finished bars, the quantity extra combinations applied to hot rolled sheets appear to be "tremendously complex," Mr. Doxsey pointed out. Many of the other common products of the steel mills, he said, bear extra setups that are filled with "bewildering inconsistencies." Summarizing the situation, he said:

"When we look at this array of quantity extras for a number of common mill products, each representing very much the same costs and the same problems to both the mills and distributers, we cannot refrain from wondering what very radical differences enter into the sale of these different products to warrant the extreme variations in the kinds of extras, the conditions for applying them, and the wide range of quantities to be found in the various brackets. Why is it, for example, that products having a small movement tonnagewise, such as hot rolled alloys and stainless sheets, take item extras which are applied to quantities under 40,000 lb., while hot-rolled sheets and galvanized sheets, sold in such comparatively greater quantities, take item extras on quantities under 2000 lb. and 1500 lb. respectively?

"The extras on these various products have been presented to emphasize the bewildering inconsistencies in the mill charges for small orders and small items. If any one or two or three of these extra schedules are sound, even allowing for the differences in the marketing and use of the products, then the others must be unsound economically and impractical commercially and must incapably serve the function of promoting good merchandising and efficient distribution."

In similar vein, A. Oram Fulton, president of Wheelock, Lovejoy & Co., Cambridge, Mass., took exception to some of the sales and distribution policies of the steel mills. Among the inconsistencies which he criticized are the following: Plates and shapes, he said, are sold on an order basis, the extra being determined by the total weight of all items, while virtually all other steel products are sold on an item extra basis; although a combination of order and item extras apply to various grades of sheets, all kinds of sheets may be combined in a carload to avoid an order extra, which is but a variation of the situation on plates and shapes and encourages the "evil" of getting together a large number of small items in order to avoid the order extra; a functional or distributer discount is given on reinforcing bars whereas a request for such a discount on other products "would be received with horror by the mill representatives"; on some products an allowance or discount is given on direct mill shipments to jobbers' customers, but not on others; the distributer is required to accept shipment of some steel products within the contract period, while he is not required to accept others within that period; attention was called to the fact

Richmond Lewis Heads Warehouse Association

• • • Richmond Lewis, of the Charles C. Lewis Co., Springfield, Mass., was elected president of the American Steel Warehouse Association at New York, last week. He succeeds Charles Heggie of the Scully Steel Products Co., Chicago.

Vice-presidents elected are E. Jungquist of the Percival Steel & Supply Co., Los Angeles, and C. H. Bradley of W. J. Holliday & Co., Indianapolis. A. W. Herron, Jr., of Jones & Laughlin Steel Corp., Pittsburgh, was re-elected treasurer, while Walter S. Doxsey remains as secretary.

that merchant pipe is shipped to jobbers on a consignment basis, while other products are not.

Mr. Fulton declared that these inconsistencies are relics of earlier days and should be corrected. Other criticisms were that mills selling promiscuously to "any peddler having the money to pay for a small lot of steel" and do not recognize or protect the distributer in any given territory.

"Once the mills are fully cognizant of these problems they will continue their cooperation and be willing to correct them," said Mr. Fulton. He offered the slogan, "What Helps the Warehouse Helps the Mill."

Q. Forrest Walker, economist of R. H. Macy & Co., New York, one of the country's largest department stores, drew comparisons and contrasts between the marketing of cotton sheets and steel sheets. Drawing upon his experience in the department store retailing field, he delivered an interesting talk, which, while not strictly applicable to the steel warehouse business, offered many worthwhile merchandising suggestions that can be used in any field. He offered the thought that steel warehouses could do a better job in promoting the service the warehouse is in a position to render. He phrased it this way:

"While you are severely limited in promotng the use of the products you sell, you are not so restricted in promoting the use of the warehouse service. An observer of your industry with limited knowledge of your problems must exercise due deference in offering critical comment, but even a casual reading of the numerous trade journals of industries that use steel seems to indicate that there is still room for improvement in the advertising and promoting of the functions of the steel warehouse."

Mr. Walker recommended sound inventory control, declared that excessive forward buying does not pay and that pricing of products sold should take into full account the cost for the services performed.

J. Halsey McKown, assistant vice-president of the United States Steel Corp., made a short talk preceding the showing of the corporation's moving picture titled "The Making and Shaping of Steel."

Are United States Machine Shops Prepared For Peace?

The rapid and widespread adoption of carbide-tipped tools for metal cutting operations in foreign plants is an outstanding example of the steps which are being taken to accelerate the production of materials for war. In Great Britain, for example, the use of Kennametal-tipped steel cutting tools has reached amazing proportions. Some plants, notably those turning shell forgings, are tooled up 100 per cent with Kennametal tools. Other plants are using Kennametal tools on every job where it is necessary to machine steel at high speeds and with a minimum of down time for regrinding tools.

But of what concern is this to American manufacturers — particularly those operating machine shops? Simply this: Those nations which are tooled up with carbide-tipped tools for the accelerated production of war materials will be at decided advantage in the scramble for world markets when hostilities cease.

To understand this it is only necessary to analyze why these hard carbide tool materials, such as Kennametal, were so quickly adopted at the outbreak of the war. War time economy and war time demands on production required that the utmost productivity be realized both from existing equipment and from the trained personnel available. It soon became evident that hard carbide tools would achieve this result with a minimum of investment and with little change from existing shop practice.

Since Kennametal will machine steel heat-treated up to 550 Brinell, at speeds from two to six times faster than high speed steel, and with ten to fifty times more pieces per grind of tool, hundreds of tools tipped with this material were purchased in Great Britain for turning, boring, milling and shaping steel parts. Not only do they cut down machining time, but their ability to machine steel in the hardened state eliminates expensive and time-consuming annealing operations, in many cases. Furthermore, the smooth, accurate finish produced by Kennametal greatly reduces subsequent grinding and polishing operations.

These economies will, of course, be as completely effective when peace is declared and foreign plants which are now producing materials of war return to the manufacture of articles for peace time consumption. The net result will be drastic reductions in the price of products offered for export—and consequent loss of American markets.

Kennametal-tipped tools such as this are now being used extensively in Great Britain to increase the production of ammunition, armaments and other materials for war.

The way is clear for American manufacturers of metal products, who have a stake in the foreign market. Only by adopting these hard carbide steel cutting tools to the same extent as they are being used abroad, can we hope to compete successfully both for export trade and for home consumption. The fact that the proper use of these carbide tools is now thoroughly understood will make this transition one that can be brought about easily and quickly. Then we can truly say, "America is prepared for peace."

(Kennametal, the most successful hard carbide tool material yet discovered for machining steel of all hardnesses up to 550 Brinell is manufactured and sold by the McKenna Metals Co., 144 Lloyd Ave., Latrobe, Pa. Trained representatives are located in principal industrial areas — they will gladly demonstrate Kennametal tools in the plants of interested manufacturers without obligation. Write to the home office. Kennametal tools and blanks are sold in Great Britain and the Dominions by George H. Alexander Machinery Ltd., Coleshill St., Birmingham 4, England.) *(Advertisement.)*

Airplane Engine Makers Satisfied With Tool Deliveries—Morgenthau

Washington

• • • **With the aircraft** industry already put under a licensing system in charge of Secretary of the Treasury Henry Morgenthau, Jr., chosen by the President to coordinate aircraft and machine tool procurement, indications are that the licensing plan will be extended to other industries, particularly to the airplane body industry, as a means of developing speedy mass production.

Secretary Morgenthau, seeking to develop the machine tool industry in connection with engine output for aircraft, said that representatives of the machine tool industry, with whom he conferred on Monday, have "got some job cut out for them." He added, however, that Wright and Pratt & Whitney, airplane engine builders, which previously complained of difficulty in obtaining precision tools, had reported to him that they are now satisfied with machine tool deliveries.

One or two types of airplane engines in each horsepower classification are being considered for selection as an initial step in breaking the "bottleneck" in engine output.

Meanwhile licensing contracts are being drawn up by the Government for signature by originators of airplane engines to be selected. The licenses will permit the Government to assign other plants to production, mass output to be started on a basis fixed by Mr. Morgenthau. He said the work will provide a "fair return for both the originator of the engine and the outside builder."

All existing engine-building capacity will be utilized in the air program, Secretary Morgenthau stated, thus fully engaging plants that have had little, if any business. Plans for expanding facilities are also under discussion.

In preparing for standardization of engine production, the Government is taking charge of a plan which it had previously not allowed engine builders to do on their own initiative. Mr. Morgenthau explained that standardization by the Government is quite a different thing from "letting three companies divide up the business."

Aviation problems also were discussed with Mr. Morgenthau by Alfred P. Sloan, chairman, General Motors Corp., on the day of the meeting with aircraft makers. The Allison Engine division of General Motors makes the only liquid-cooled engine adopted by the Air Corps for fast pursuit planes.

"A certain strategic material" was discussed by Chairman Edward R. Stettinius of the United States Steel Corp., with Mr. Morgenthau, the latter said, when Mr. Stettinius called at the Treasury Department last Thursday, the day of the aircraft meeting.

↓ ↓

Machine Tool Men Study Defense Program

Washington

• • • **The machine tool** industry met in Dayton, Ohio, on Tuesday to study the Army and Navy national defense program laid before a committee from the National Machine Tool Builders' Association at Washington on May 27. The vast outlay for machine tools, which will be about $200,000,000, was presented by the Machine Tool Committee of the Army and Navy Munitions Board when the machine tool builders held a brief preliminary meeting with Secretary of the Treasury Henry Morgenthau, Jr. The remainder of the day was spent with Army and Naval officers.

At the Dayton meeting machine tool producers will each be asked to state what portion and kind of tools he can make and the time of delivery that can be made. Upon receiving these details the machine tool builders' committee will return to Washington next Monday and report their findings to the Army and Navy Machine Tool Committee and Mr. Morgenthau, the latter selected by the President to coordinate the machine tool and aircraft industries for the Government.

Machine tool builders said that despite the huge size of the program, they believed they could execute it in time without either expansion or calling upon the Government to finance any part of it. The money represents that to be expended by both the Government and private industry. The chief objective is to speed up engine output for the 50,000-airplane program. The demand to be made upon the machine tool industry is indicated by the statement that at present its volume of output is running at the rate of $385,000,000 a year. That the requirement, however, is pressing and may call for three-shift operations to step it up is made clear by the fact that the President has said that Allied orders are not to be interrupted. Hence the American Army and Navy demands will be superimposed on Allied business placed and to be placed.

Secretary Morgenthau said that the national defense machine tool orders are for the entire existing program of the Army and Navy, exclusive of demands that will be made in connection with the recently adopted program for the training of air pilots.

The machine tool people were given a complete breakdown of the machine tools wanted. Saying that the list is confidential, Secretary Morgenthau explained that it includes all kind of tools, some of which, he stated, are boring and milling machines, lathes, planers, gear cutters and forging machines.

The subjects were not discussed, it was stated, but the program may call for setting up a licensing system for "farming out" a limited number of machine tools and may also involve a system of priorities. There was said to be no immediate prospect of either plan.

Mr. Morgenthau explained that there was only minor discussion regarding the contribution of the automobile industry to the program. For the present he said that he does not think it will be necessary to call upon it for tools, dies and jigs or for technical aid. He said that he understands the automobile industry will not be interrupted in its present retooling for 1941 models. The retooling, he stated, will be completed in about a month.

"We think it will be in the inter-

est of national economy to let the automobile proceed with its retooling program unless something unforeseen develops," said Mr. Morgenthau.

He added that it was found also that tools needed by the automobile industry and by the aircraft industry are the same in only a few cases.

Representatives of the machine tool industry who are discussing the machine tool program with the Government are: Tell Berna, general manager, National Machine Tool Builders Association, Cleveland; Clayton R. Burt, president, Pratt & Whitney, Hartford, Conn.; Charles J. Stilwell, president, Warner & Swasey Co., Cleveland; Howard W. Dunbar, vice-president and general manager, Norton Co., Worcester, Mass.; Norman D. MacLeod, president, Abrasive Machine Tool Co., Providence, R. I.; and John E. Lovely, vice-president, Jones & Lamson Machine Co., Springfield, Vt.

Members of the machine tool committee of the Army and Navy Munitions Board who presented the program are: Col. H. K. Rutherford, United States Army; Major W. H. Soderholm, United States Army; Capt. E. D. Almy, United States Navy; Comdr. E. R. Henning, United States Navy; and O. F. Warhus, engineer, United States Navy.

Attending the Washington conference also was Lewis Lind, chief, Machinery Division, Foreign and Domestic Commerce, Department of Commerce.

Wisconsin Companies to Build New Plants

Milwaukee

• • • **Because of the** demand for special alloy castings, the Motor Casting Co., 1111 S. 65th Street, will open an additional plant in the building formerly occupied by the Wisconsin Grey Iron Foundry, according to L. Roth, president and secretary of Motor Castings. It is expected the new plant will be ready for operation June 10.

At Kiel, Wis., the H. G. Weber Co., manufacturer of paper bag machinery has broken ground for an addition to its main building and a new wing which will necessitate hiring of additional employees.

Steel Imports Gain 22% In April To 6192 Tons

• • • **At 6192 gross** tons valued at $1,026,425, imports of iron and steel (scrap excepted) in April were larger by 22 per cent in quantity and 26 per cent in value in comparison with March receipts of 5067 tons valued at $813,303, preliminary figures released by the Metals and Minerals Division of the Bureau of Foreign and Domestic Commerce reveal. In April, 1939, this trade had totaled 41,314 tons valued at $2,703,092.

Three-fifths of the April imports came from Sweden—3840 tons—while Norway supplied nearly a quarter—1442 tons. Canada, with a total of 483 tons, was the only other supplier of consequence. Norway supplied 1408 tons of ferro-manganese received.

Scrap imports totaled 482 tons.

HOW MUCH DOES THE "FINISH" OF YOUR PRODUCTS COST YOU?

The Profilometer in use by S K F Industries, Inc., for measuring the inside surface of the outer ring for the spherical roller bearing used on large calender stacks for paper mills.

The Chrysler Corporation uses the Profilometer for the measurement of many of their production parts. The illustration shows roughness measurements being taken on a piston.

Measurements are made at regular intervals on sheets of windshield glass in the Glass Plant of the Ford Motor Company. By the use of the Profilometer, a constant control of the surface roughness of the glass is always assured. By controlling this roughness in grinding, subsequent rejection after polishing has been practically eliminated.

● Perhaps you have felt that the measurement of surface roughness has no place in your manufacturing operations. But have you considered that definite, *accurate* roughness ratings can be the means of materially reducing both production time and costs?

Take as an example, the manufacturer who, by the use of the Profilometer, found that a two-hour polishing operation could be eliminated—without affecting in any way the practical requirements of his product. In another case, the Profilometer has proved valuable in noting immediately variations in the grinding of glass. As any change in the roughness of the glass appears, it is corrected at once with no loss of time and with a minimum of finished glass rejection. In the many plants where it is now used, the Profilometer is constantly indicating where unusual irregularities occur in the finish and where needless steps are being taken to secure desired results.

The Profilometer provides ***direct dial readings in true inch units*** exactly in accordance with roughness ratings now generally accepted and widely used. It is simple to use. It is so sturdily constructed that it can be used right in the shop. If "finish" is important in your products, you'll find it a ***practical*** instrument that will pay for itself many times over.

WRITE FOR NEW, COMPLETE LITERATURE.

The PROFILOMETER

PHYSICISTS RESEARCH COMPANY

343 SOUTH MAIN ST. • ANN ARBOR, MICH.

Stettinius, Knudsen Appointed to National Defense Commission

Washington

• • • **President Roosevelt** on Tuesday appointed Edward R. Stettinius, Jr., board chairman of the United States Steel Corp., and William S. Knudsen, president of General Motors Corp., as full time members of a National Defense Commission to be set up by the White House under the National Defense Act of 1916.

Mr. Stettinius' assignment will cover industrial materials while Mr. Knudsen's job will pertain to industrial production.

Other members of the 7-man commission will include:

Employment—Sidney Hillman, president, Amalgamated Clothing Workers of America, a CIO affiliate.

Farm Products—Chester C. Davis, member of the board of governors, Federal Reserve System and former head of the Agriculture Adjustment Administration.

Transportation — Ralph Budd, board chairman, Chicago, Burlington & Quincy Railroad and chairman, Association of American Railroads.

Prices — Leon Henderson, member of the Securities and Exchange Commission.

Advisor on Consumer Protection — Harriett Elliott, dean of women, University of North Carolina.

The commission will act directly under the Council of National Defense, to be composed of six cabinet officers. Members will serve without compensation and, in the words of the President, will perform the essential functions of several war time bodies including the Munitions Board which functioned during the World War.

The commission will hold its first meeting on Thursday.

President Empowered to License Export of Steel

Washington

• • • **The Smith bill** to license the exportation of scrap iron and steel, which had been slumbering in the House Military Affairs Committee for several months, was revived last week, broadened to include all materials "essential to industry," and was included as an amendment in an Army authorization bill when that measure passed the House last Friday.

Its passage was in tune with the current trend in Congress to vest more and more emergency power in the Chief Executive, and came at a time when the part to be played by business executives in the defense picture appeared to be relegated to the background in favor of Government officials.

Offered as an amendment by Representative J. Joseph Smith, sponsor of the scrap licensing bill, the expanded provision was accepted by the House without opposition. Its provisions are so broad, to use the words of Mr. Smith, that it will apply not merely to scrap iron and steel but to "any of the materials necessary to our own defense." Conceivably, it could cover pig iron, finished steel, machine tools and other products if the President so decreed.

As adopted by the House, the amendment provides that "Whenever the President determines that it is necessary in the interest of national defense to prohibit or curtail the exportation of any military equipment or munitions, or component parts thereof, or machinery, tools, or material necessary for the manufacture of servicing thereof, he may by proclamation prohibit or curtail such exportation, except under such rules and regulations as he shall prescribe. . . ."

The provision, represented as having been prepared in the planning branch of the War Department and made specifically applicable to munitions, machinery and tools necessary for the production of munitions, empowers the President to declare an embargo at his discretion on an unlimited range of items, including those on which the Administration previously had invoked the so-called "moral embargo" as well as on manganese, tin, chrome and other materials covered in the war stock pile purchasing program.

In its report recommending passage of the broadened scrap licensing measure, the House Military Affairs Committee expressed the opinion that "supervision is needed over the export not only of scrap iron and scrap steel, but also of pig iron and of all the materials which are considered by the War Department to be necessary for our domestic industry in time of war."

The May bill, an authorization measure as distinguished from an appropriation bill, also would permit the President, in providing for emergencies affecting the national security and defense, to furnish Government-owned facilities at privately owned plants; to authorize the procurement and training of civilian personnel necessary in connection with the production of critical and essential items of equipment and material; to purchase additional quantities of strategic and critical war materials. The bill authorizes a total of $132,000,000 in appropriations for the use of the President to meet army requirements.

Unions Liable To Trust Suits

Washington

• • • **In a six-to-three** opinion written by Associate Justice Stone, the Supreme Court on Monday held that labor unions are subject to prosecution under the anti-trust laws but at the same time denied relief in the form of damages under the Sherman Act to the Apex Hosiery Co., of Philadelphia, for destruction of company property during a 1937 sit-down strike.

In denying damages to the company, Justice Stone ruled that the Sherman Act draws no distinction between restraints on commerce by violent and peaceful means. Chief Justice Hughes sharply dissented, joined by Associate Justices McReynolds and Roberts.

The court affirmed the ruling by the United States Circuit Court of Appeals for the Third Circuit which had set aside a $711,932 judgment against the hosiery workers union, the CIO union affiliate which sponsored the sit-down strike.

Machine Tool Industry Won't Be Bottleneck, J. E. Lovely Says

Cleveland

• • • **If any bottleneck** arises in the national defense emergency it will not be due to the machine tool industry, leaders emphasized at the 38th spring convention of the National Machine Tool Builders Association here May 28.

JOHN E. LOVELY, association president, asserted that machine tool producers will be able to turn out their products just as rapidly as men can be trained to put them into actual operation. CLAYTON R. BURT, chairman of the association's committee for cooperation with Government departments, expressed a similar viewpoint.

"When war broke out last fall," Mr. Lovely said, "heavy orders from the Allies were followed by still heavier and immediate demands, especially upon the part of the United States manufacturers of aircraft and aircraft engines. Increased production was accomplished by adding to the equipment of present plants, by inaugurating multiple shifts, by farming out parts making to outside concerns, and by plant expansions.

"Prices have been increased only so far as has been necessary to meet the increased costs of production which were inevitable under these circumstances. On the average, I would say, on the basis of my own observation, that prices have increased since the outbreak of the war by not over 10 to 12 per cent.

The committee on cooperation with the Government, headed by Mr. Burt, was enlarged from five to fifteen members.

Inadequately low depreciation allowances were criticized in a paper by Frederick V. Geier, first vice-president of the association.

"If we accept low depreciation rates we undermine the policies of our customers and the market for our business," said Mr. Geier after comparing depreciation rates allowed by tax authorities with those actually determined by industrial experience.

Among other speakers were: Tell Berna, general manager of the association, Mrs. Frida Selbert, secretary, Wendell E. Whipp, treasurer, B. P. Graves, chairman of the committee on electrical problems, and Myron S. Curtis.

JOHN E. LOVELY, vice president, Jones & Lamson Machine Co., has the important post of president of the National Machine Tool Builders Association in the U. S. defense program. ←

Steel Wage Order on U. S. Business in Effect

Washington

• • • **All Government** departments purchasing iron and steel products were advised by the Labor Department's Public Contracts Division on Monday that, effective May 27, all Government bids for iron and steel must thereafter contain the steel wage stipulation, requiring adherence to the Labor Department's prescribed minimum wage rates for the steel industry.

Bids on 1000 Tanks For Army Due June 11

Chicago

• • • **Bids will be** opened in two weeks at the Rock Island Arsenal from private manufactures for 1000 fighting tanks. Bids were opened at the arsenal last week for 350 carriages for the 37 mm. anti-tank gun and bids will be opened this week for a quantity of armor plate. The arsenal has been working at full speed for some time.

United Aircraft Plans $8,000,000 Expansion

• • • **United Aircraft Corp.** directors have approved a further $8,000,000 expansion of the Pratt & Whitney Aircraft division, which has already been tripled in capacity in a year. The new addition, to be built on the south side of the present plant at East Hartford, Conn., will be completed within three months.

"The needs under the expanded national defense program as outlined in Washington in the last week, as well as increased orders for engines for the Allies, were the factors responsible for the decision to build another addition to the present plant," Frederick B. Rentschler, United Aircraft chairman, said.

Canadian Ferro-Alloy Output Rises in April

• • • **Production of** ferro-alloys in Canada was 13,989 tons in April, an increase of 69 per cent over March output, Dominion Bureau of Statistics reports. Output in April, 1939, was 4284 tons.

Both steel ingot and pig iron production in April, however, was below March level. Ingot output was 153,451 tons, against 157,326 tons in March, while blast furnace production was 84,210 tons in April, as compared with 91,772 tons in preceding month.

Electric furnace steel output in April rose to 9458 tons from 7722 tons in March, but this rise was cancelled by drop in open hearth operations. Blast furnace operations at the end of April were at 76 per cent of capacity.

Boeing Aircraft to Build $1,900,000 Plant Addition

Seattle

• • • **Boeing Aircraft Co.** has awarded a $1,900,000 contract for an addition to its plant No. 2 here. About 577,000 sq. ft. additional space will be provided. Design and construction of the new facilities have been awarded the Austin Co., Cleveland.

Personals

Change is inevitable in progressive Industry. Change is constant.

• **D. J. Henecker** has been appointed assistant manager of wire products sales in charge of wire rope sales and **C. E. Kendall** has been appointed to a similar post for wire and galvanized sheets for the Jones & Laughlin Steel Corp., Pittsburgh. The wire rope sales division of the company has been consolidated into the wire products division under **J. E. Timberlake,** present manager of wire products sales.

Mr. Henecker has been associated with the wire rope industry since 1922, when he was employed in the New York warehouse of the American Steel & Wire Co. Nine years later he was made assistant sales manager of the Eastern division and in 1932 left the American Steel & Wire Co. to join the sales force of Wickwire Spencer Steel Co. as assistant manager. Later he was made sales manager of the Buffalo district. In 1937 he was appointed general manager of wire rope sales and, in addition in 1939, he became sales manager for all products of the Eastern district.

Mr. Kendall was manager of merchant product sales for the Pittsburgh Steel Co. before becoming identified with Jones & Laughlin in February, 1939. Practically his entire business experience has been with Pittsburgh Steel, with which he started in 1919 in the Chicago office. Subsequently he became assistant manager of that office, assistant manager of the fence department at Pittsburgh and manager of that department in 1930. Five years later he was made manager of the merchant products sales department.

D. J. HENECKER, assistant manager of wire products sales, in charge of wire rope, Jones & Laughlin Steel Corp.

• **Max W. Lightner** has been appointed assistant to general superintendent at the Homestead works, Carnegie-Illinois Steel Corp., Pittsburgh. He was formerly chief metallurgist at Homestead. Mr. Lightner, who received degrees in metallurgy from the Pennsylvania State College and Carnegie Institute of Technology, began his corporation service as an assistant metallurgist at Homestead in 1933. He was appointed assistant chief metallurgist in 1934, and became assistant superintendent of open hearth No. 4 two years later. He has been chief metallurgist since March 1, 1937.

• **D. A. Williams,** president of Continental Steel Corp., Kokomo, Ind., has been named chairman of the executive committee to succeed the late Niles Chapman.

• **Garland L. Rathel,** since 1927 purchasing agent, has been elected vice-president in charge of purchases. **Urlin K. Becker,** vice-president and formerly secretary of the company, has been elected treasurer and a member of the executive committee. **William G. Harter,** assistant treasurer, has in addition been made secretary.

• **C. R. Hale** has been appointed purchasing agent of the Air Reduction Co., 60 East Forty-second Street, New York, and its subsidiary and affiliated companies. Mr. Hale, a Columbia graduate, joined the Airco purchasing department in 1925 and has been assistant purchasing agent since 1936. In his new position he succeeds **H. M. Daggett,** who has retired.

• **J. R. Kumer, Jr.,** for the past year assistant manager of sales, stainless bar and wire products, for the Allegheny Ludlum Steel Corp., Pittsburgh, has been appointed manager of stainless bar and wire sales. He entered the steel business in 1919 with the Union Steel Casting Co., Pittsburgh, with which he remained until 1926 when he joined Allegheny Steel Co.

• **Truman B. Brown,** who joined Ludlum Steel Co. in 1934, taking the student course, has been appointed manager of Ludlite sales for Allegheny Ludlum Steel Co., with headquarters at Watervliet, N. Y. In 1935 he was transferred to the sales department of the Chicago office and returned to Watervliet two years later to work on the development of Ludlite products.

• **Louis F. Lippert** has been made manager of Pluramelt sales for Allegheny Ludlum, with headquarters in Pittsburgh. He joined Allegheny Steel Co. in 1913 as a

C. E. KENDALL, assistant manager wire products sales, in charge of wire and galvanized sheets for Jones & Laughlin.

typist and 10 years later was transferred to the stainless division. He became identified with the sales division in 1927.

• **Charles E. S. Dickerson,** since 1936 president and general manager of the Miami-Dickerson Steel Co., Dayton, Ohio, and identified with Edgar T. Ward's Sons Co., Pittsburgh, since the beginning of this year, has been appointed manager of sales of cold finished steel bars, both carbon and alloy. His career in the steel industry started in 1928 with the Dickerson Steel Co., of which he shortly became vice-president and general manager.

• **William H. Pratt,** consulting engineer of the General Electric Co., West Lynn works, has retired after 45 years' service. Mr. Pratt entered the West Lynn works in 1895 after graduating from Massachusetts Institute of Technology, and was made foreman of the laboratory. Later he became associated with the general engineering staff, and became chief consulting engineer of the entire plant.

• **Paul G. Hoffman,** president of the Studebaker Corp., served this year as referee of the Indianapolis 500 Mile Memorial Day Race and the lightweight Studebaker Champion car will serve as the official pace car piloted by Ab Jenkins. The pace car was scheduled to go as a prize to the winner of the 500 mile race.

MAX W. LIGHTNER, assistant to general superintendent at Homestead works, Carnegie-Illinois Steel Corp.

• **Gerald E. Stedman,** who has had an extended experience in merchandising industrial equipment, has been appointed sales manager of the Rego Division of the Bastian-Blessing Co., Chicago.

• **Dr. Howard A. Smith,** until recently research metallurgist with the Rustless Iron & Steel Co., Baltimore, and previously in charge of stainless steel development in the laboratories of Republic Steel Corp. at Canton, Ohio, has been made chief metallurgist of the Duraloy Co., Scottdale, Pa.

• **Richard L. Templin,** chief engineer of tests, Aluminum Co. of America, was awarded an Edward Longstreth medal by the Franklin Institute in recognition of his invention of a deformation recording apparatus. The award was made in Philadelphia, May 15, by Dr. Henry Butler Allen, director of the Institute.

• **Fay Ryan,** of the Electric Auto-Lite Co., Toledo, has been named president of the Foremen's Club of Toledo. At the annual meeting more than 1000 heard **W. J. Cameron** of the Ford Motor Co. speak on "Turns in the Road."

• **Frederick G. Hughes,** general manager of New Departure Division, General Motors Corp., Bristol, Conn., was elected president of the Anti-Friction Bearing Manufacturers Association at its annual meeting at White Sulphur Springs, May 18.

• **Paul C. Farren,** of Greenfield, Mass., has been made chairman of the Springfield chapter, American Society for Metals.

• **William C. Ritzau,** process engineer, and **Robert E. Smith,** inspection superintendent of motor accessories, A C Spark Plug Division of General Motors Corp., have been transferred to the Allison Engineering division at Indianapolis.

• **A. L. Moses,** formerly vice-president and sales manager of Great Lakes Forge Co., Chicago, has been elected vice-president of American Forge division of the American Brake Shoe & Foundry Co. His office is in the New Center Building, Detroit.

• **Theron C. Taylor,** formerly vice-president of Belle Isle Lime Co., Detroit, has been appointed sales manager of the industrial division of Standard Minerals, Inc., Detroit, manufacturer of expanded vermiculite.

• **Edwin C. Barringer,** executive secretary of the Institute of Scrap Iron and Steel, Inc., New York, will address scrap dealers in Los

GARLAND L. RATHEL, new vice-president in charge of purchases, Continental Steel Corp.

C. R. HALE, purchasing agent of Air Reduction Co., its subsidiary and affiliated companies.

Angeles, San Francisco, Portland, Seattle, and perhaps other Coast cities in the course of a visit to the two Pacific Coast chapters of the institute from May 27 to June 12.

• **Dexter A. Tutein,** who for many years has been engaged in the selling of pig iron, coke, ferroalloys and steel in domestic and export trade, has opened his own office at 230 Park Avenue, New York, as the Tutein Corp. He will engage in export and domestic sales of iron and steel and allied products.

• **O. N. Harstad,** general manager of the Milwaukee Road, was elected president of the Western Railway Club last week. Other officers are: First vice-president, **W. W. Kelly,** general purchasing agent, Santa Fe; second vice-president, **C. M. House,** superintendent motive power and equipment of the Alton Road; treasurer, **J. W. Fogg,** vice-president and general manager, MacLean-Fogg Lock Nut Co.; and executive secretary, **W. L. Fox,** general superintendent, the Belt Railway of Chicago.

• **Dr. Edward E. Marbaker,** for 20 years a fellow of Mellon Institute, engaged in research and development work in chemistry, ceramics and metallurgy, has been appointed to the incumbency of the industrial fellowship founded by the O. Hommel Co., Pittsburgh.

• **John Slezak,** since 1931 vice-president and general manager of the Turner Brass Works, Sycamore, Ill., has been elected president.

• **Roscoe L. Hambleton,** heretofore of the overseas division of General Motors Corp., has been appointed manager of the foreign division of the Crosley Corp., Cincinnati.

• **James C. Stewart,** formerly president, has been elected chairman of the board of James Stewart & Co., New York. **Harry D. Watts,** heretofore executive vice-president, has been elected president.

• **Joseph Oesterle,** professor at the University of Wisconsin, was elected chairman of the Milwaukee section of the American Society for Metals at its annual meeting at the Milwaukee Athletic club. Other officers named were: Vice-chairman, **Dr. Harry Ihrig,** Milwaukee; secretary and treasurer, **Ernst Guenther,** Milwaukee.

• **Lawrence E. Barringer,** engineer in charge of electrical insulation for the General Electric Co., Schenectady, N. Y., has been awarded the Benjamin G. Lamme medal for achievement "in the field of research and development of materials for electrical insulation" by Ohio State University.

Obituary

• **Gen. Otto H. Falk,** chairman of the board of the Allis-Chalmers Mfg. Co., Milwaukee, died last week at his home in that city on May 21 after a long illness, aged 74 years. General Falk was one of the most prominent citizens in Wisconsin's history, having been a leader in industrial, civic and military affairs.

The first 30 years of his life, General Falk devoted to the military, enrolling in the National Guard at Milwaukee in 1886. The General saw considerable active service with the National Guard including the Spanish-American War, and was promoted through the ranks until in 1911 he was appointed Brigadier General, about which time he retired to enter industry.

THE late Gen. Otto H. Falk, chairman of Allis-Chalmers Mfg. Co.

In the industrial and financial fields, the General's most conspicuous work was in the reorganization of the old Allis-Chalmers Co., of which he was named receiver in 1912 and about a year later was elected president of the reorganized concern. Some years ago he was made chairman of the board. General Falk was also a vice-president of the Falk Corp., Milwaukee, a director of the First Wisconsin National Bank, the Wisconsin Telephone Co., the Milwaukee Mechanics Insurance Co., and the Wisconsin Manufacturers Association.

• **William H. Quinn,** New York district manager of Chain Belt Co., Milwaukee, died suddenly, May 5, in New York. Mr. Quinn had been with the company since 1923, and manager of the New York office since 1928. He was 48 years old.

• **John M. McKinley,** vice-president in charge of operations of North American Refractories Co., a former president of the American Ceramics Society and president of the American Society for Testing Materials, died May 19 in a Cleveland hospital after a short illness following an operation. He began his career at 16 with Carnegie Steel Co., became general manager of the Crescent Refractories Co. in 1910, and went to Cleveland with North American in 1929. He was a trustee of the Orton Foundation in Columbus, endowed for ceramic research.

• **Josiah McCartney,** 86 years old, founder of the Great Lakes Brass Foundry Co., Bay City, Mich., died May 11. Mr. McCartney started the foundry in Bay City about 1900 and had operated it since that time, in recent years with the assistance of his son, Hugh McCartney.

Ralph N. Robertson, chief engineer and treasurer of Bradshaw & Co., Pittsburgh, died on April 30, aged 64 years. He was a graduate of Cornell University and was for a number of years chief engineer of the Omaha plant of American Smelting & Refining Co. He became identified with the Andrews-Bradshaw Co., Pittsburgh, as chief engineer in 1926, and from 1928 to 1933 was general engineer of the Blaw-Knox Co. He joined Bradshaw & Co. as chief engineer in 1933.

Metal Working Activity

. . . *Latest Data Assembled by The Iron Age*

From Recognized Sources. In Net Tons.

	April 1940	March 1940	April 1939	4 Months 1940	4 Months 1939
Steel Ingots:					
Monthly output[a]	3,974,706	4,264,755	3,352,774	18,303,811	14,139,679
Average weekly output[a]	926,505	962,699	781,532	1,058,636	824,471
Per cent of capacity[a]	61.04	63.42	51.11	69.75	53.91
Pig Iron:					
Monthly output[b]	3,137,019	3,270,499	2,302,918	13,751,020	9,728,770
Raw Materials:					
Coke output[c]	4,086,747	4,771,030	2,934,560	17,464,005	13,034,807
Lake ore consumption[d]	4,407,035	4,578,299	3,135,741	19,660,219	13,323,191
Scrap consumption[r]	3,083,000	3,283,840	2,595,000	14,016,000	10,930,242
Castings:					
Malleable, orders[e]	.....	.....	29,183	.....	136,519
Steel, orders[e]	.....	36,612	34,388	.....	150,722
Finished Steel:					
Trackwork shipments[a]	.....	8,446	6,819	.....	20,459
Fabricated shape orders[f]	.....	127,731	118,309	.....	397,805
Fabricated plate orders[e]	.....	35,435	35,844	.....	109,042
U. S. Steel Corp. shipments[g]	907,904	931,905	771,752	3,994,657	3,235,153
Fabricated Products:					
Automobile production[h]	422,000††	423,299	337,375	1,681,027††	1,354,709
Steel furniture shipments[e]	.....	$2,424,300	$1,619,218	.....	$7,165,228
Steel boiler orders[e] (sq. ft.)	.....	760,668	764,996	.....	3,329,637
Locomotives ordered[i]	50	40	19	136	93
Freight cars ordered[i]	1,812	1,076	2,695	4,259	5,702
Machine tool index[j]	93.4	93.4	61.2	93.2†	58.7†
Foundry equipment index[k]	192.9	243.4	146.0	205.3†	142.8†
Non-Ferrous Metals: (U. S.)					
Lead shipments[l]	46,563	46,353	37,903	171,967	153,384
Lead stocks[l]	63,463	74,692	123,394	.....	.....
Zinc shipments[m]	46,978	51,095	40,641	287,533	168,399
Zinc stocks[m]	81,234	73,611	130,380	.....	.....
Tin deliveries[n] (gross tons)	7,855	9,244	5,980	19,170	33,479
Refined copper deliveries[o]	68,665	64,376	42,484	287,684	192,613
Refined copper stocks[o]	169,120	159,795	332,513	.....	.....
Exports:					
Total iron and steel[p]	.....	743,658	441,289	.....	1,781,618
Rolled and finished steel[p]	.....	357,722	150,615	.....	150,615
Semi-finished steel[p]	.....	115,027	9,911	.....	9,911
Scrap[p]	.....	231,759	266,214	.....	1,115,578
Imports:					
Total iron and steel[p]	6,674	5,096	49,373	26,784	130,217
Pig iron[p]	286	583	3,933	4,815	9,362
Rolled and finished steel[p]	.....	2,474	36,497	.....	84,507

†Three months' average. *Not available. ††Preliminary.

Source of data: [a] American Iron and Steel Institute; [b] THE IRON AGE; [c] Bureau of Mines; [d] Lake Superior Iron Ore Association; [e] Bureau of the Census; [f] American Institute of Steel Construction; [g] United States Steel Corp.; [h] Preliminary estimates by THE IRON AGE—Final figures from Bureau of the Census, U. S. only; [i] *Railway Age;* [k] Foundry Equipment Manufacturers Association; [l] American Bureau of Metal Statistics; [m] American Zinc Institute; [n] New York Commodity Exchange; [o] Copper Institute; [p] Department of Commerce; [r] Institute of Scrap Iron and Steel.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	May 28, 1940	May 21, 1940	Apr. 30, 1940	May 29, 1939
Flat Rolled Steel:				
(Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	1.90	2.00
Cold rolled sheets	3.05	3.05	2.85	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.30	3.50
Hot rolled strip	2.10	2.10	1.90	2.00
Cold rolled strip	2.80	2.80	2.60	2.80
Plates	2.10	2.10	2.10	2.10
Tin and Terne Plate:				
(Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes:				
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Wire and Wire Products:				
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.45
Rails:				
(Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel:				
(Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Wire Rods and Skelp:				
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	1.92
Skelp (grvd.)	1.90	1.90	1.90	1.90

	May 28, 1940	May 21, 1940	Apr. 30, 1940	May 29, 1939
Pig Iron:				
(Per Gross Ton)				
No. 2 fdy., Philadelphia	$24.84	$24.84	$24.84	$22.84
No. 2, Valley furnace	23.00	23.00	23.00	21.00
No. 2, Southern Cin'ti	23.06	23.06	23.06	21.06
No. 2, Birmingham	19.38	19.38	19.38	17.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	22.34
Basic, Valley furnace	22.50	22.50	22.50	20.50
Malleable, Chicago†	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L. S. charcoal, Chicago	30.34	30.34	30.34	28.34
Ferromanganese‡	100.00	100.00	100.00	80.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap:				
(Per Gross Ton)				
Heavy melting steel, P'gh	$18.75	$18.75	$16.75	$14.375
Heavy mltng. steel, Phila.	**18.50**	17.75	16.75	15.25
Heavy mltng. steel, Ch'go	17.25	17.25	15.625	13.00
Carwheels, Chicago	18.75	18.75	17.75	12.75
Carwheels, Philadelphia	20.75	20.75	20.25	16.00
No. 1 cast, Pittsburgh	19.25	19.25	17.75	15.25
No. 1 cast, Philadelphia	**20.75**	20.25	20.25	16.25
No. 1 cast, Ch'go (net ton)	16.75	16.75	15.75	11.75
Coke, Connellsville:				
(Per Net Ton at Oven)				
Furnace coke, prompt	$4.00	$4.00	$4.00	$3.75
Foundry coke, prompt	5.25	5.25	5.25	4.75
Non-Ferrous Metals:				
(Cents Per Lb. to Large Buyers)				
Copper, electro., Conn.*	11.50	11.50	11.50	10.00
Copper, Lake, New York	11.50	11.50	11.50	10.00
Tin (Straits), New York	*53.50*	54.00	47.25	49.00
Zinc, East St. Louis	**6.00**	5.75	5.75	4.50
Lead, St. Louis	4.85	4.85	4.95	4.60
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	14.00

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 92 to 98 herein. On export business there are frequent variations from the prices shown above. Also, on domestic business there are at times price ranges for various products, and these ranges are shown in detailed price tables herein.

Composite Prices . . .

	FINISHED STEEL	PIG IRON	SCRAP STEEL
May 28, 1940	2.261c. a Lb.	$22.61 a Gross Ton	$18.17 a Gross Ton
One week ago	2.261c. a Lb.	$22.61 a Gross Ton	$17.92 a Gross Ton
One month ago	2.211c. a Lb.	$22.61 a Gross Ton	$16.38 a Gross Ton
One year ago	2.236c. a Lb.	$20.61 a Gross Ton	$14.21 a Gross Ton

	FINISHED STEEL High	FINISHED STEEL Low	PIG IRON High	PIG IRON Low	SCRAP STEEL High	SCRAP STEEL Low
1940	2.261c., Jan. 2	2.211c., Apr. 16			$18.17, May 28	$16.54, Mar. 19
1939	2.286c., Jan. 3	2.236c., May 16	$22.61, Sept. 19	$20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c.. Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Summary of the Week

• Substantial buying movement develops in steel and pig iron . . . Ingot production up four points to 79 per cent, scrap composite higher . . . National defense plans and export trade stimulate greater domestic acitvity

FOREHANDED consumers of iron and steel have launched another of those intensive buying movements which characterize periods of great stress. While business has been steadily improving during the past few weeks, it made a sharp advance in the past week which will bring the May volume for some companies close to the high figures of last autumn.

Notwithstanding the caution and confused state of mind caused by the succession of disturbing news from Europe, steel and pig iron buyers have quickly sensed the possibility of shortages or delayed deliveries later on and are building up their inventories in anticipation of greatly expanded requirements of the Allies and our own Government for its national defense program.

Air bombing of the Ruhr district of Germany by the Allies has revived the danger that steel plants on both sides may be put out of commission, thereby increasing the dependency of the Allies on this continent for steel and pig iron.

ALLIED purchases of steel here are now expected to become a routine procedure at a volume far in excess of previous requirements. Moreover, a greater volume is coming from Canada, while neutral countries are turning to this country to a larger extent. Shell billets amounting to 36,000 tons for the first large British shell order placed in this country have been divided among three steel companies. France may soon place about 140,000 tons of steel with American mills.

In addition to greatly expanded steel purchases by domestic consumers, a considerable volume of pig iron business has been done, deliveries extending through the third quarter. Some companies are virtually sold up for the next two months at least.

While specifications for sheets and strip against recent low-priced commitments have been a factor in the larger aggregate steel volume of the past week, they are not alone responsible as orders have increased for nearly all products, many of them obviously for stock.

Despite higher steel production and larger shipments, mill backlogs are being built up at a surprisingly rapid rate. Ingot output this week, it is estimated, will average 78 per cent of the industry's capacity, with further rises probable. The sharpest gain has been at Chicago, where the rate has advanced eight points to 83 per cent, while the Pittsburgh rate went up five points to 78 per cent. Several other major districts have recorded gains of one to five points. A leading producer is operating this week within a few points of its maximum rate of last fall.

The advance of scrap prices has been more hesitant, no changes having occurred at Pittsburgh and Chicago, though in the latter center a substantial mill purchase has confirmed brokers quotations of $17.50. A higher quotation at Philadelphia brings THE IRON AGE steel scrap composite price to a new 1940 high of $18.17, an advance of 25c. over last week.

NATIONAL defense plans and export trade were the major factors in the sharp stimulation of raw material buying of the past week. As some form of Government priority will undoubtedly go into effect if required, those users who may not be engaged in munitions work are seeking the protection of larger inventories.

Although Government organization work for the program has not been completed, contracts for construction work and materiel manufacture are already being hastened. Among fabricated structural steel lettings is one of 1750 tons for an addition to the Pratt & Whitney Aircraft plant at East Hartford, Conn., while bids are being taken on 2500 tons for a hangar at Wright Field, Dayton, Ohio, on 2200 tons for a naval air station at Jacksonville, Fla., and on 2000 tons for an addition to the Boeing Airplane Co. plant at Seattle, Wash. Many other such projects are pending or will shortly be in the market. The first of the many calls for bids for Army supplies are being sent out and include 1000 fighting tanks, which the Rock Island Arsenal is asking private manufacturers to figure on. Bids were opened by the arsenal last week on 350 carriages for 37mm. anti-tank guns.

The Vinson bill, which has passed the House of Representatives, provides for expediting Naval shipbuilding and for priority for machine tools required for Naval work. A further provision places iron and steel scrap and "any of the materials necessary to our defense" under a licensing plan which, presumably, would apply to seel, pig iron and other strategic materials.

The national defense program will require about $200,000,000 worth of machine tools, which tool builders assert will be supplied without creating any bottleneck from that source.

The Industrial Pace . . .

STEEL making operations rose again this week, establishing output at 78 per cent of capacity, the highest point reached since the last week of January. The week's increase is the fifth consecutive weekly improvement recorded since early April when the rate was hovering around 62 per cent.

The scrap composite also moved higher in the week, touching $18.17. Significantly, this increase was not due to consumer purchases, but to covering operatinos by brokers, indicating the degree to which the bullish attitude has permeated the scrap industry.

Further indication of the faster tempo developing in manufacturing activities throughout the country is found in the improvement registered in THE IRON AGE index of capital goods activity in the past week. At the close of the period the index stood at 76.3, as compared with 74.6 in the previous week and 71.0 a month ago. The increase, which was the fifth consecutive weekly gain, was due primarily to the influence of the steel production series. This series advanced 5.8 points in the week, as physical output continued to expand in a counterseasonal movement.

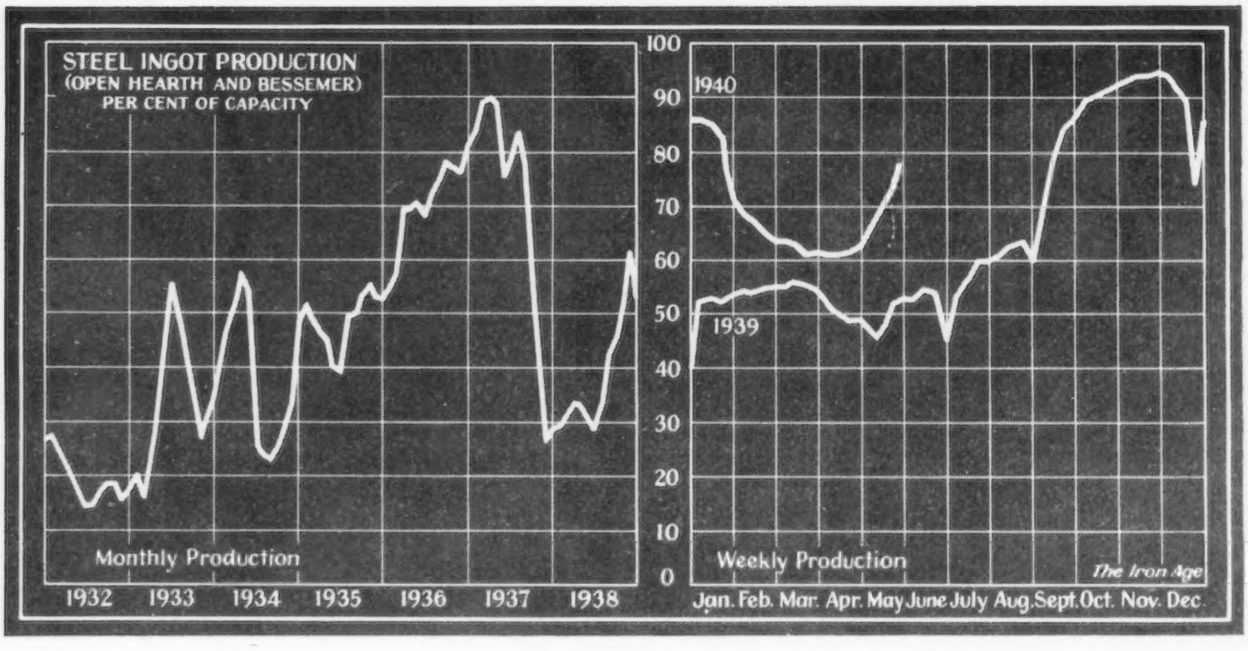
The loss in automobile assemblies was slightly larger than the seasonal trend, causing a decline in the adjusted index for this component. The heavy construction factor also showed a loss, due largely to a 27 per cent decline in private lettings. The week's total awards, $43,857,000, was made up of $15,091,000 in private work and $28,766,000 in public contracts. The largest single award reported during the week was for a paper mill at Pensacola, Fla., costing $2,000,000.

An example of the confusion that is still encountered in attempting to project trends is in the decline in metal and metal products prices (see accompanying graph) registered in the first half of May. This loss is due largely to lower prices ruling on castings, pig lead and lead pipe.

Undoubtedly the sharp rise in scrap prices recently will shortly cause a reversal of this trend.

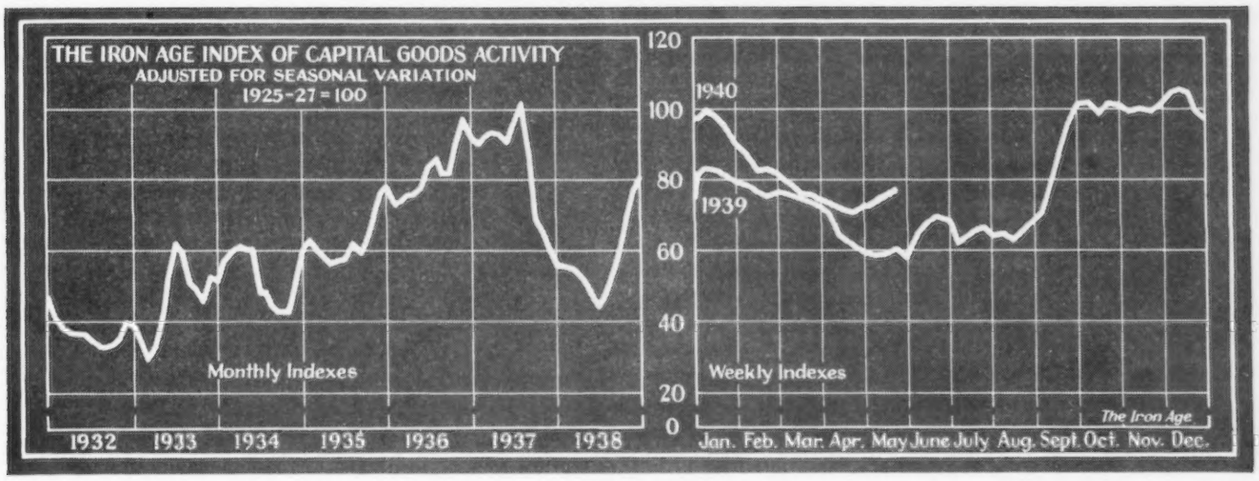
Although revenue freight carloadings in April were sharply below those of March, the trend over the past few weeks has been upward. Part of the April decline may be attributed to the fact that there were only four weeks in April, but five in March. Further expansion of the export movement will have some influence on the volume of loadings. While at the moment there does not appear to be any shortage of rolling stock, it is probable that if the present upward movement is maintained, important railroad purchasing may materialize.

Steel Output Gains Four Points to 78%



District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	West-ern	St. Louis	East-ern	Aggre-gate
Current Week	78.0	83.0	68.0	79.0	79.0	79.5	91.0	81.5	84.5	75.0	71.0	67.0	48.0	**78.0**
Previous Week	73.0	75.0	65.0	77.0	74.0	76.5	95.0	81.5	81.5	75.0	71.0	64.5	48.0	**74.0**

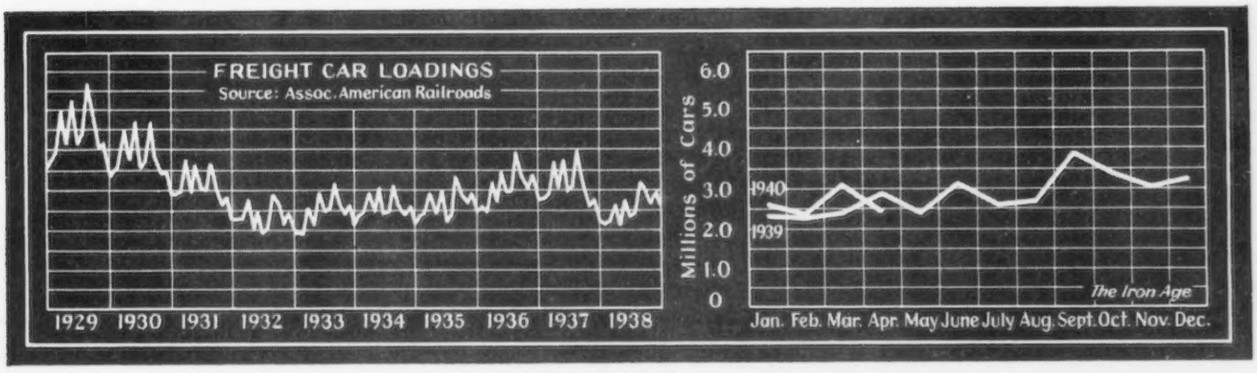
Capital Goods Index Registers Fifth Consecutive Increase



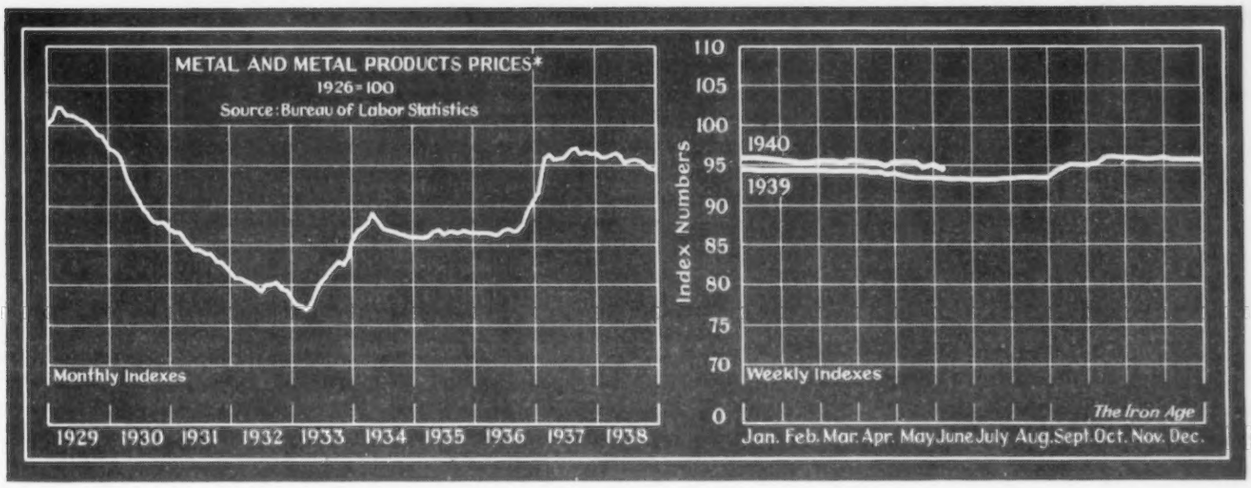
▼Components — Week Ended ➤	May 25	May 18	Apr. 27	May 27 1939	May 25 1929
Steel ingot production[1]	96.6	90.8	79.7	63.2	128.0
Automobile production[2]	82.8	83.7	82.3	58.0	129.8
Construction contracts[3]	51.4	52.4	56.7	74.7	130.4
Forest products carloadings[4]	61.6	58.9	56.9	53.2	120.4
Pittsburgh output and shipments[5]	89.2	87.4	79.5	55.3	126.1
COMBINED INDEX	76.3	74.6	71.0	60.9	126.9

Sources: [1] THE IRON AGE; [2] Wards Automotive Reports; [3] *Engineering News-Record*; [4] Association of American Railroads; [5] University of Pittsburgh. The indexes of forest products carloadings and activity in the Pittsburgh area reflect conditions as of the week ended May 18. Other indexes cover the week of May 25.

April Freight Carloadings Drop Below Year Ago



Metal Products' Prices Fall in First Half of May



* Based on 147 items, including iron, steel and non-ferrous metals, and finished products as agricultural equipment, automobiles, tools, bolts, etc.

Market News

. . . THE WEEK'S ACTIVITIES IN IRON AND STEEL

STEEL OPERATIONS

. . . Rate for industry rises four points to 78 per cent

INGOT PRODUCTION is higher in nearly all of the important districts this week. An average for the industry of 78 per cent is indicated by reports to THE IRON AGE. Accompanying the higher steel production is an increase in active blast furnace capacity, particularly in the Chicago and Pittsburgh districts.

A leading producer is now operating within a few points of its maximum rate during the boom of last fall.

Production in the Pittsburgh district has risen five points to 78 per cent, while the Chicago district has gained eight points to 83 per cent. Other districts have either held at last week's rate or have advanced a few points with the exception of the Wheeling-Weirton district, where bessemer capacity was taken off.

NEW BUSINESS

. . . Orders sharply higher as users protect against possible delivery delays

INCOMING STEEL BUSINESS at Pittsburgh in the past two weeks has been sufficient to support an ingot rate of approximately 70 to 80 per cent, and bookings in the past week have been at a higher level than this. Whether this increased tempo, which includes a good domestic demand as well as greater export requirements, will hold for some time, remains to be seen. While much of the current order volume represents forward buying for building up stocks to avoid shortages later on, no small portion also reflects specifications against low priced sheet and strip commitments. However, with greatly augmented purchases from France and England a practical certainty, and with the United States armament program to get under way soon, it is logical to look for a continuation of present high order volume and ingot output for some time to come.

LARGE TONNAGES in nearly all products have been entered on the books of Chicago sellers during the past week. The seriousness of the European situation has undoubtedly been the major factor in driving in this business, which in some offices is double that of a month ago and from 50 to 70 per cent ahead of a week ago. The largest tonnage items are sheets and strip, semi-finished and bars, sheet specifications were received last week at the best rate since the blanket orders were entered some time ago, but sellers are still very anxious that the remainder of these specifications be sent in as soon as possible as they intend to adhere strictly to the deadline of June 30, beyond which shipments will not be made. Semi-finished steel at Chicago is being sold primarily to non-integrated mills, to warehouses and to forgers, some of the latter having orders for shells.

Since Chicago manufacturing and fabricating plants in general are not operating at a rate in proportion to the steel business they are placing, it is to be assumed that much of this tonnage is going into stock, especially in view of the fact that some steel companies have been advising their customers to build up their stocks as a safeguard against a repetition of last fall's hectic buying period.

Because of an increase in the price of carbon black and a higher volume of residential construction, pipe sales to jobbers have improved. Small shapes are better because of buying from makers of farm implements and road building equipment.

AT CLEVELAND aggregate steel orders are sharply improved, and with production and shipments are climbing. However, to a great extent markets are shadowed by uncertainty over the course of events abroad. Buying policies of steel users show wide divergence, depending upon their proximity to armament work in this country or to export markets. Considerable of the tonnage now under blanket contracts or specified for long term deliveries is of such a nature that dislocation would result from an end to hostilities.

THE SIGNIFICANT ASPECT to current sales in Philadelphia is that most of them call for prompt delivery. Consumers apparently are endeavoring to build up plant inventories to circumvent consequences of possible delivery delays in the future. Specifications received thus far against low-priced material range from 50 to 70 per cent of total commitments. Sellers are continuing to drive for rolling instructions and believe that most of the specifications will be in hand in time to be shipped by June 30. Construction steel buying is rather slow at the moment but there are prospects of improvement in the near future. Bar sales, especially to machine parts makers and forgers, are expanding at a fast pace. In at least one direction, difficulty is being encountered in meeting customers' delivery requests.

New York steel sales offices have experienced sharply increased business. One office reports that its May tonnage may easily be the largest on record, exceeding even the peak figure of last autumn. Another reports that its total tonnage is nearly four times that of April. Specifications for sheets and strip do not account for the increase; nearly all products have had improvement.

PIG IRON

. . . Sudden buying move started by defense measures

HEAVY BUYING OF pig iron was reported last week in some districts, particularly in the East, where almost all large purchasers covered for at least their early requirements. President Roosevelt's "50,000-plane" address to the nation started a quick buying movement which left some furnaces out of the market for months ahead.

Sharply higher steel production and a further advance in scrap prices were factors in the upturn which has not, however, been accompanied by any substantial im-

provement in the melting rates of foundries in areas like New York and Cleveland.

For the first time in several weeks, there has been a slight upward trend in pig iron sales and shipments at Pittsburgh. Production at integrated steel mills is on the upgrade owing to higher ingot operating rates, and within the past week Carnegie-Illinois Steel Corp. has blown in two additional furnaces, one at Farrell work and one at Carrie furnaces.

ORDERS FOR May at Cleveland are improved substantially over the April volume. The improved demand arises principally from depletion of consumer inventories. Many foundries are marking time awaiting buying from the railroad and automotive industries. Melters catering to the machine tool and allied fields remain busy. At the start of this week order books for third-quarter shipments of pig iron had not been opened at Cleveland but were expected to be opened within a few days.

May shipments of pig iron at Chicago are well ahead of a month ago, while foundry coke shipments are holding about even. Considerable forward buying has been seen in the past week or two. Customers appear to be anxious to obtain coverage as a safeguard against eventualities. Gary works of Carnegie-Illinois Steel Corp. blew in a ninth blast furnace last week and another stack may be started up there soon. Inland Steel Co. blew in a fifth stack last week preparatory to banking a furnace, but at this writing all five are in operation.

THE RAPID RISE in scrap prices and heavy steel bookings of the past few weeks have brought out a substantial buying movement in Philadelphia. This buying is essentially of a protective nature for actual consumption has not changed materially over the past few weeks. Bulk of current purchases calls for fairly prompt delivery.

Melters have been active in the southern Ohio market during the past week, to cover needs for the third quarter. Foundry operations there, however, have not changed materially. Agricultural melters are in a trifle better position, although the stove foundry production is in an unseasonable slowness.

An improvement in buying is noted at Boston. Furnace representatives say that while buying is not general there is the indication that at least some foundries either expect higher pig iron prices or orders from the Government in connection with its armament program. Most orders placed recently are for June and July delivery.

A pronounced expansion in pig iron shipments is reported at Buffalo. Shipments for the current month to date are about 10 per cent better than the same period a year ago.

MERCHANT BARS

. . . Orders are gaining some presumably for stock?

HOT ROLLED BAR SALES at Pittsburgh are more numerous than a week ago, with concrete evidence that some consumers have increased their normal takings of steel on the basis that steel supplies might be somewhat tighter a month hence. Current demand is somewhat miscellaneous with practically all sources specifying. Hot rolled alloy bar sales are likewise stronger and considerable impetus will be given this market when U. S. Government orders for additional planes are placed.

Cleveland reports that shipments to cold finishers who have encountered heavy war-time demand are the principal feature of the bar market. Aggregate orders for May show a comfortable gain over April.

Forgers, cold drawers, steel warehouses and manufacturers of tractors and farm implements are all active consumers at Chicago. Some automotive parts makers have also been in the market in the past week, presumably starting up on orders for 1941 models.

. . . PLATES . . .

. . . Upward movement of ordering is in progress

PLATES ARE SHARING substantially in the general upward movement at Chicago. Warehouses, railroad shops, and makers of railroad equipment have been in the market for fair tonnage as have also various structural fabricators. Aside from the bids now being taken by the Great Northern on an additional 1000 cars, no railroad buying of importance is known of in this district.

Shipbuilding, export, structural, and forward buying have combined to push plate sales up slightly at Pittsburgh in the past week. Some consumers are adding to inventories to eliminate the possibility of shortages later in the year.

At Cleveland orders during the past week have been maintained at approximately the level which prevailed earlier this month. Requirements of machinery builders, makers of road building equipment, and steam shovels are producing fair tonnage.

A general improvement in demand was also experienced by eastern Pennsylvania sellers in the past week. Warehouses are adding to their inventories and fabricators are specifying against projects which have been pending for some time. New business being booked generally calls for quick delivery.

Weekly Bookings of Construction Steel

Week Ended ⟶	May 28, 1940	May 21, 1940	Apr. 30, 1940	May 29, 1939	Year to Date 1940	Year to Date 1939
Fabricated structural steel awards	18,000	10,620	6,700	35,215	310,680	414,125
Fabricated plate awards	4,030	1,910	450	1,610	63,035	71,810
Steel sheet piling awards	250	0	1,770	1,400	16,540	23,005
Reinforcing bar awards	5,800	13,150	4,150	7,400	174,600	203,545
Total Letting of Construction Steel	28,080	25,680	13,070	45,625	564,855	712,485

This situation has resulted in a rather sharp increase in the district's rolling mill schedules over the past 10 days. Awarding of tonnages required for two cruisers booked by a shipyard has been postponed. Canadian purchases in the past week were centered largely on floor plates.

One eastern Pennsylvania producer is requiring that all third-quarter inquiries be referred to the general sales office for approval before accepting.

Southwest Welding & Mfg. Co., Alhambra, Cal., will fabricate about 2400 tons of large diameter pipe for the Glendale-Burbank distribution line of the Los Angeles Metropolitan Water District. Concrete pipe suppliers were successful bidders on another portion of this pipe line, which would have taken about 1700 tons had plates been chosen.

RAILROAD BUYING

. . . Rio Grande buys 500 cars . . . Burlington orders nine engines

DENVER & RIO GRANDE WESTERN has awarded 500 box cars to Pressed Steel Car Co., and Burlington has placed nine diesel-electric switchers with Electro-Motive Corp. Missouri Pacific is seeking bids on 30 70-ton hopper cars. Bids on 10 fish-belly flat cars for Alaskan air bases have been taken by the Army Department.

LONG-AWAITED MODERNIZATION of Chicago's transit equipment is about at hand, according to a statement from the City Traction Commission. If the unified traction ordinance is approved at the public referendum to be held about Aug. 1, a 60-million-dollar program extending over three years will be started, with 42 millions more to be expended over the next five years. The three-year program call for 550 all-steel subway-elevated cars, 900 street cars and 640 buses. An additional 450 rapid transit cars, and 1100 street cars or the equivalent in buses will be acquired over the next five years. The plan also calls for extensive rehabilitation of elevated structures, track and shop equipment.

Missouri Pacific has purchased six diesel electric switching locomotives allocated as follows: American Locomotive Co., and Baldwin Locomotive Works, two each 660 hp.; Electro-Motive Corp. one 660 hp. and one 1000 hp.

SHEETS AND STRIP

. . . Specifications heavier against commitments but are not all in

SHEET AND STRIP specifications at PITTSBURGH within the past week have expanded somewhat with miscellaneous consumers getting in shipping instructions at a more rapid pace than was the case a few weeks ago. Steel producers look for peak activity in the volume of sheet and strip specifications between now and June 15. Hot rolled capacity is fairly well booked up to the end of June in some cases but the tardiness of the automobile industry in getting in its specifications has left some room on cold mill schedules. This space, however, is expected to be filled shortly as automobile companies are expected to specify at a much greater rate within the near future.

In the past week at CHICAGO, specifications against low priced commitments for sheets and strip have increased substantially. Some sellers believe that the major portion of the specifications expected have now been received, although when compared with the tonnage on the books in the form of blanket orders, the specifications on hand do not appear so favorably. It is felt by some important producers that a great many of the sheets now being ordered out are destined for stock and will not be put into immediate use since few consumers are as busy today as their orders indicate.

CHICAGO sheet mills are still adhering strictly to the June 30 deadline on shipment of these low price tonnages and not once has it been heard that shipments are being deferred past this limit. One important mill has arbitrarily set June 1 as the deadline for receiving specifications and early this week at least this company was still quite set on this date. Rolling schedules in some mills already are filled nearly to the end of the quarter in galvanized and light gages of hot rolled sheets but there is still room for heavy hot rolled and cold rolled.

JUDGING FROM MAY specifications at CLEVELAND, sellers say it appears probable consumers will not take out before June 30 all the tonnage placed under blanket contracts. As sheet and strip order backlogs now range from two to three weeks, it is evident that rolling mill capacity for the remainder of June will permit acceptance of only part of the outstanding tonnage before the deadline. The automotive industry is now releasing specifications for late June delivery. Export inquiries and orders are well maintained. Such items as electrical sheets and enameling sheets are in good demand currently.

Most sheet users in the New York area have held off as long as possible in specifying sheets placed on open contract at the $4 cut prices, but as the end of the month neared, under pressure of the sellers, these specifications were coming in in substantial volume—enough to cause some doubt as to whether all the material specified can be rolled and shipped by the end of June.

FOREIGN USERS OF FLAT STEEL were active in the southern Ohio market during the past week, ordering at a greater rate than has heretofore prevailed. Inquiries for steel from export sources also was reported with prospect of further ordering imminent.

REINFORCING STEEL

. . . Awards of 5800 tons include 1800 tons for soup factory

REINFORCING STEEL awards total 5800 tons, with the largest award of 1800 tons for the Campbell Soup Co., Camden, N. J.

New reinforcing steel products of 8450 tons include 2125 tons for the Caddoa Dam, Caddoa, Cal., and 1377 tons at San Rafael, Cal., for a viaduct.

Opening of bids for improvements to five locks and dams in the Mississippi River, requiring 1250 tons of reinforcing bars, has been rescheduled for May 28.

The large building which Goldblatt Brothers, Chicago department store owners, have in prospect and which was reported last week as involving some 2500 tons of reinforcing bars, is still on the drafting board and actual construction depends entirely upon the European situation and the outlook for American business.

Substantial tonnage is outstanding for military construction on the Pacific Coast and Pacific Islands.

STRUCTURAL STEEL

. . . Naval and aviation expansion adds to new projects

FABRICATED STRUCTURAL STEEL lettings advanced to 18,000 tons from 10,650 tons last week, with the greatest activity in the Central States. The largest awards are 2300 tons at Lafayette, Ind., for the Aluminum Co. of America; 1750 tons at East Hartford, Conn., for the Pratt & Whitney aircraft division; 1630 tons at Kettle Falls, Wash., for a State bridge; 1500 tons for the Weirton Steel Co. at Weirton, W. Va., 1200 for a bottling plant for the F. & M. Brewing Co., Brooklyn, and 1155 tons for a State bridge at North Adams, Mass.

New structural steel projects at 20,540 tons are double those of a week ago. The outstanding inquiries include 4300 tons at Hartford, Conn., for an office building for the National Fire Insurance Co.; 2500 tons for a hangar at right Field, Dayton, Ohio; 2200 tons for a Naval Air Station building, Jacksonville, Fla.; 2000 tons for the Boeing Airplane Co., Seattle, Wash.; 1800 tons at Deer Park, N. Y., for a State building, and 1700 tons for Cardinal Hayes Memorial College in New York.

SEMI-FINISHED STEEL

. . . Specifications up substantially, well ahead of April's

THE VOLUME OF semi-finished steel specifications in the past week is up substantially from the week before and considerably in excess of weekly tonnages placed a month ago. While part of this increase has been due to export business from both neutral countries as well as the Allies, domestic non-integrated mills have been specifying heavily as they must ship finished sheets before the end of this quarter. It is expected that semi-finished requirements for France and England will be placed periodically, probably once every month or so. No significant business in addition to tonnages placed a few weeks ago has been booked within the past week. Wire rod sales at PITTSBURGH are somewhat ahead of a month ago, with foreign business an important factor. Skelp demand has also increased substantially, owing to some consumers building up inventories in view of current world-wide conditions.

At CLEVELAND this month is closing with sales activity well maintained and impressive gains being shown in total tonnage as compared with April volume.

LARGE TONNAGES of semi-finished steel have been booked by Chicago producers in the past week and May is far ahead of April to date. Purchases from non-integrated mills are accounting for the bulk of this tonnage but forgers have also been quite active.

WIRE PRODUCTS

. . . New peak for year in orders recorded at Cleveland

ORDER VOLUME for all wire products at CLEVELAND during May has established a new peak for this year and was considerably ahead of April. Operations and shipments are beginning to reflect the improvement. Principal interest of sellers centers upon large foreign inquiries and orders including generous demand for rods from Great Britain. On the domestic side a number of large consumers have anticipated their requirements for some time ahead, as a hedge against a possible tight situation on steel.

Total wire sales at PITTSBURGH are comfortably ahead of a month ago with most expansion being shown in wire rods, fence and nails. A further pick-up in manufacturers' wire demand is expected in view of the quickening tempo in all steel markets.

Though demand for merchant wire products at Chicago has been good in recent weeks, the peak has not yet been reached because of a continuation of cold and rainy weather. In spite of it being nearly June, Chicago has not yet had a full week of warm sunny weather which, according to Chicago wire sellers, is all that is needed usually to bring out a large volume of business from country jobbers. Consumers of industrial wire, which in that district center around suppliers to the automotive industry, especially makers of springs for seats, have become less active recently.

DOMESTIC WIRE is rapidly being adapted to applications heretofore held by Swedish steel.

BOLTS, NUTS AND RIVETS

. . . Orders are improving and prices "satisfactory"

BOLT, NUT AND CAP SCREW manufacturers in CLEVELAND report volume improving as the month draws to a close. Prices are reported satisfactorily maintained. Makers of rivets describe May orders as being "average." No decided spurt has been experienced, but a moderate amount of shipbuilding and railroad car building requirements has been received.

TUBULAR GOODS

. . . Demand is showing a little improvement

TUBULAR GOODS DEMAND at Pittsburgh is a little stronger than a week ago with oil country goods specifications showing the greatest increase. Miscellaneous line pipe demand is holding and no falling off has been noted in merchant pipe sales.

TIN PLATE

. . . Operations are up two points to 72%

TIN PLATE OPERATIONS this week are estimated at 72 per cent, up two points from a week ago. Domestic specifications have increased in volume within the past week, owing to seasonal factors and it is expected that can makers soon will send in additional specifications representing a logical build-up of inventories in view of current world conditions. Export buying has picked up within the past 10 days, with an upward trend expected to continue.

Tin plate sales in Chicago last week were fairly good and indications are that heavier tonnages will be placed within the next two to three weeks.

. . . EXPORT BUYING . . .

. . . Orders from neutral countries are increasing

NO SUBSTANTIAL PURCHASES have been made by the Allies within the past week. Export tonnages from this source are expected to be placed in a routine manner in the future and, as reported here last week, direct tonnages will probably run 300,000 tons a month or more.

Machine Tools

. . . SALES, INQUIRIES AND MARKET NEWS

Aircraft Demand Increasing

New York

• • • As would be expected, the demands of the aircraft industry for machine tools has increased since the President's announcement of an ultimate capacity of 50,000 planes per year. One of the big engine builders in the East has already started its fourth program since September, and another aircraft engine builder is lining up new proposals. Other Government activity is still in the talk stage, and the release of much machinery buying awaits the release of Government contracts. Particularly true of general ordnance work, this statement also applies to some of the builders of lower horsepower aircraft engine and aircraft auxiliaries. No buying of machine tools in connection with the Allied munitions program has been reported in the past week. The delivery situation continues to perplex most dealers, who look to the setting up of priorities by a qualified Government coordinator as being the most desirable solution to the problem of an enhanced defense program.

Shipments Ahead of Buying

Cleveland

• • • The attention of the entire machine tool industry is centered upon cooperation with the United States armament program. The industry is favorably situated to meet the needs of the military branches, with its productive capacity probably 40 per cent larger than in late 1939. But if utmost speed is necessary, priority may be resorted to or certain plants restricted to essential machines or perhaps certain military branches given the power to take machines intended for export.

Inquiries Reflect War Influence

Chicago

• • • Though few orders have been received here for use in making actual war materials, there is little doubt but that the war influence has been a great factor in the increased volume of inquiries that has appeared in recent weeks. Demand is fairly well diversified and last week such companies as Fairbanks-Morse, Bendix Aviation and Caterpillar Tractor were in the market for various types of production equipment. The new plant of Kearney & Trecker in Milwaukee is scheduled for completion around July 1.

Domestic Demand Stimulated

Cincinnati

• • • **May machinery business** in this area shows no diminution from the steady flow of orders that had been coming in throughout the current year. Present business was characterized by one of the leading producers in the area, who stated that, while the hysterical ordering of last fall has definitely passed, the current business represents a good full month for his plant.

Big Demand for Welders

Detroit

• • • Sales of special welding equipment have reached a high level in recent weeks with one order for $150,000 worth of resistance welding machines received by a local manufacturer. Projects which have absorbed the greatest number of machines are in automobile plants but a manufacturer of highway transport trailers is currently in the market for spot welders. It is understood that the Ford program, which includes an all-welded chassis frame, will result in the expenditure of nearly $500,000 by the time the program is completed.

Non-Ferrous Metals

. . . MARKET ACTIVITIES AND PRICE TRENDS

New York, May 28—The market again in the past week experienced a series of bullish and bearish spasms, but ended the week on a generally firm tone. The day-to-day developments abroad found reflection in the daily changes in the volume of buying. Some measure of optimism, however, was found in the few meager details of the proposed rearmament program revealed during the week. Unquestionably this program will call for heavy tonnages of non-ferrous metals. Adding to that factor, the fairly certain possibility of increased exports of zinc and lead and the relatively low state of refined metal stocks, gives a reasonable basis for the assumption that at least over the next six months, the non-ferrous markets should be fairly active.

A fair domestic demand for copper persisted throughout the past week. Sales for the period averaged around 1300 tons per day, bringing the total for the month through Saturday to 51,900 tons, as compared with 37,200 tons in the corresponding period of a month ago. On Friday a noticeably stronger price tone developed and quotations in the outside market slowly rose. By Monday noon, practically all sellers, including smelting interests, were at the producers' level of 11.50c. per lb. Export interest was extremely light all week. Nearby metal for foreign shipment was available this morning at prices ranging from 11.35c. to 11.50c., f.a.s.

Zinc

A spotty demand persisted all the past week and though the period's sales of prime Western metal were only 4845 tons, or half of the previous week's total, the price tone gathered strength as the week progressed, reaching a climax on Friday when an advance of ¼c. to 6c., East St. Louis, was posted. The higher prices had little effect on sales. Demand this morning was fairly heavy, especially for nearby metal, with many consumers covering in the belief that still higher prices were in the offing. Consumption of spelter has not improved materially over the past two weeks and consequently consumers' stocks are being built up to a sizable degree. The week's shipments were 3643 tons, as against 3972 in the preceding week.

Tin

Establishment of third quarter production quotas at 100 per cent is not expected to have any observable influence on available supplies. First quarter quota was 120 per cent, but actual output was in the neighborhood of 100 per cent. Second quarter output was set at 80 per cent, with a 20 per cent carryover from the first quarter. Thus actual output has been averaging 100 per cent thus far this year.

The new developments in Europe Tuesday considerably reduced the amount of offerings available. Straits metal in New York today (Tuesday) is quoted at 53.50c for nearby delivery, while cash standard in London is quoted at £268.

Lead

A moderately active demand for June positions was experienced throughout the past week. Buyers do not now appear as eager for supplies as they did 10 days ago, but the steady reduction in refined stocks over the past several months has caused some buyers to take steps toward building up inventories. Refined stocks at the close of April were about 63,000 tons, while May shipments are estimated to have been again in excess of 46,000 tons.

Non-Ferrous Metal Prices on page 93

the practical side of Springmaking—BY DUNBAR

ask yourself these questions about your springs

Are we now using the proper spring material?
Are there too many . . . or too few coils?
Do our springs have a tendency to take a "set"?
Are we paying for operations that can be eliminated?
Should ends be ground . . . or would plain ends answer the purpose?
Why do we have to replace springs?
Are we paying for unnecessarily close tolerances?

ASK

Dunbar Bros. Co.

DIVISION OF ASSOCIATED SPRING CORPORATION

BRISTOL, CONNECTICUT

If you have any question about the performance of your springs, why not send your assembly here for a practical analysis

Scrap . . . MARKET ACTIVITIES AND QUOTATION TRENDS

NEWS OF SERIOUS SETBACKS to the Allied armies in Europe has tended to put a damper on the scrap market. While most district markets continue strong, No. 1 heavy melting steel is unchanged in price at Pittsburgh for the second consecutive week, and a substantial mill sale in the Chicago district has substantiated last week's quotation there on No. 1. As has been the case in recent months, however, brokers are having difficulty in covering such a mill sale at a profit almost immediately after its consummation. No. 1 is up 75c. on the average at Philadelphia, based largely on broker-dealer transactions, and this rise accounts for the increase of 25c. in the composite price from $17.92 to $18.17. The composite stood at $16.75 four weeks ago and has averaged $17.61 for the four weeks of May.

Buffalo prices are up 50c. on the average, based on small sales, but at Cleveland and Youngstown, prices are nominally unchanged. Dealer buying prices are higher at most points where such figures are quoted. Export buying prices are tending to lag, and there is no rush to cover the recent Italian business. Boats for Italy are not expected for at least two weeks and even their arrival is in doubt. Recent export shipments have all been to the United Kingdom.

Pittsburgh

Although the market continues strong, buyers and sellers alike remain fairly well at an impasse, apparently influenced somewhat by the European situation and its possible consequences. Brokers are selling nothing that they have not already covered and buyers are still reluctant to make offers for large tonnages, for the time being at least. No. 1 heavy melting is quotably unchanged at $18.50 to $19 but can be considered nominal. Some No. 1 steel was sold into consumption late last week at $18.50 a ton, while other points in the district are paying at least $19 a ton delivered and some brokers are paying the top price to cover.

Chicago

A large mill purchase of No. 1 steel at $17.50 last week was shared in by a number of local brokers. Brokers still are paying $17.50 to cover their orders, with some offering $17. But $17.25 is about the least dealers will accept and that only for single cars. The market is still very strong, in spite of the depressing news from Europe Tuesday and the break in the stock market. Local mills are increasing their operations so rapidly, and orders are piling up at sales offices at such a rate, that operations almost certainly will continue at a high level for some time. It is awareness of this latter fact that makes downright pessimism on the part of the scrap trade unlikely, in spite of the foreign news, though the presence of considerable uncertainty is obvious.

Philadelphia

The market here is still very strong and both brokers and consumers continue to exhibit considerable reserve in trading activities. No. 1 steel is quoted this week at a flat $18.50, an increase of 75c. over the average of the preceding week. In the absence of consumer activity, this price represents an appraisal of present conditions based largely on broker-dealer buying. Material is being gathered at Port Richmond for two boats for England expected early in June. One boat will take 3000 tons and the other 2200 tons. Exporters are paying $17.75 for No. 1 and $16.25 for No. 2.

Youngstown

The market undertone remains strong but keyed to the developments abroad. At the start of this week negotiations toward a sale with one buyer who has added open hearths were still pending, and the district lacked other fresh mill sales. Prices remain nominal and unchanged.

Cleveland

Scrap is still hot, but the market is devoid of new local sales at the start of this week. Mill buyers may not act until after the June railroad lists close, depending upon events abroad. Some dealers are hesitant to go short and afraid to go long under current conditions. Foundry grades remain in good demand. Prices are unchanged this week.

Buffalo

Strength continues to dominate the trade, with the price upturn extended an additional 50c. a ton. On small sales No. 1 heavy melting steel reached $18 to $18.50 a ton. Offerings continued light as dealers hold the belief that higher prices are in the offing. The range on borings was advanced to $10.50 to $11 a ton on a few small sales. Cast scrap remains in brisk demand as export buying from Canada is active. Another boatload of 5000 tons has arrived from an upper Lake port.

Cincinnati

While there has been no appreciable increase in mill activity in the scrap market, dealers have been actively trading during the past week to place themselves in good position for anticipated mill purchases. Small quantities of scrap have been moved to consumers at reported better prices.

St. Louis

Brokers prices on scrap iron were up from 25c. to $1.50 a ton this week. There was one sale of a limited tonnage of No. 2 heavy melting steel at present prices, but caution rules on the part of shippers, brokers and consumers. The foreign situation plus higher pirces in other markets cause strength in the market. Railroad lists: Pennsylvania, 20,000 tons; Baltimore & Ohio, 7500 tons; Chicago, Burlington & Quincy, 2900 tons; Chicago, Milwaukee, St. Paul & Pacific, 2700 tons.

Birmingham

Scrap dealers are watching the local situation with keen eyes, confidently expecting that scrap will begin an upward climb within a few days due to the rapid developments in this country from the European war. The prospective activity of industrial operations caused many dealers to expect an increase in prices this week but leadership expected from a large buyer failed to develop and for the time being the upward step has been stalled.

New York

There has been no rush to cover the recent Italian business, which looked large in the aggregate but actually represents a normal purchase on the part of that country. Boats for Italy are not expected much before June 12 and there is plenty of material on hand to take care of such loadings. In the meantime, there is much doubt in everyone's mind whether any of this tonnage will be shipped, as the European situation becomes blacker from day to day. Except for stove plate, export buying prices are unchanged. Prices of scrap on cars for domestic delivery are 50c. a ton higher on the average, reflecting higher delivered prices in eastern Pennsylvania.

Boston

Domestic interest centers very largely in steel turnings at $6.90 a ton on cars, up 50c. a ton from a week ago; in blast furnace material at $5.15 a ton on cars; and in bundled skeleton at $10.40 a ton on cars, unchanged from a week ago. The export market continues active with shipments confined to England. Exporters who have previously had trouble with Italy about dollar balances and short weights, and others who believe the material eventually will go to Germany, are not partial to Italy's reported purchase of 250,000 tons of scrap.

Toronto

While prices are showing a firmer trend in Canadian iron and steel scrap markets and dealers have been looking for advances daily in steel materials, no definite action has been taken.

Detroit

Scrap supplies are tightening in Detroit and even the currently high prices are failing to bring out much tonnage. One estimate of dealer positions is that dealers are selling about one-half of their accumulations and holding the remainder. Automotive plant production of scrap has decreased rapidly in recent weeks. There are indications that the falling off in automobile sales may actually curtail production programs and further reduce scrap output.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$18.50 to $19.00
Railroad heavy melting	20.00 to 20.50
No. 2 heavy melting	17.00 to 17.50
Railroad scrap rails	20.00 to 20.50
Rails 3 ft. and under	22.50 to 23.00
Comp. sheet steel	18.50 to 19.00
Hand bundled sheets	17.50 to 18.00
Heavy steel axle turn.	16.50 to 17.00
Machine shop turnings	12.50 to 13.00
Short shov. turnings	13.50 to 14.00
Mixed bor. & turn.	9.25 to 9.75
Cast iron borings	9.25 to 9.75
Cast iron carwheels	20.00 to 20.50
Heavy breakable cast.	16.00 to 16.50
No. 1 cupola cast	19.00 to 19.50
RR. knuckles & coup.	23.50 to 24.00
Rail coil springs	23.50 to 24.00
Rail leaf springs	23.50 to 24.00
Rolled steel wheels	23.50 to 24.00
Low phos. billet crops	23.50 to 24.50
Low phos. punching	21.50 to 22.00
Low phos. heavy plate	21.50 to 22.00
Railroad malleable	23.50 to 24.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$18.50
No. 2 hvy. mltng. steel	17.50
Hydraulic bund., new	18.50
Hydraulic bund., old	14.50 to 15.00
Steel rails for rolling	20.50 to 21.00
Cast iron carwheels	20.50 to 21.00
Hvy. breakable cast	19.50 to 20.00
No. 1 cupola cast	20.50 to 21.00
Mixed yard (f'd'y) cast	17.00 to 17.50
Stove plate (steel wks.)	16.00 to 16.50
Railroad malleable	21.00 to 22.00
Machine shop turn	11.00 to 11.50
No. 1 blast furnace	9.50 to 10.00
Cast borings	10.50 to 11.00
Heavy axle turnings	14.00 to 14.50
No. 1 low phos. hvy.	21.50 to 22.00
Couplers & knuckles	21.50 to 22.00
Rolled steel wheels	21.50 to 22.00
Steel axles	22.50 to 23.00
Shafting	23.00 to 23.50
Spec. iron & steel pipe	16.00 to 16.50
Cast borings (chem.)	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$17.00 to $17.50
Auto. hvy. mltng. steel alloy free	16.00 to 16.50
No. 2 auto steel	13.75 to 14.25
Shoveling steel	17.00 to 17.50
Factory bundles	16.50 to 17.00
Dealers' bundles	15.00 to 15.50
No. 1 busheling	16.00 to 16.50
No. 2 busheling, old	8.00 to 8.50
Rolled carwheels	19.50 to 20.00
Railroad tires, cut	20.00 to 20.50
Railroad leaf springs	19.00 to 19.50
Steel coup. & knuckles	19.50 to 20.00
Axle turnings	15.50 to 15.75
Coil springs	20.50 to 21.00
Axle turn. (elec.)	16.50 to 17.00
Low phos. punchings	19.00 to 19.50
Low phos. plates 12 in. and under	19.50 to 20.00
Cast iron borings	10.50 to 11.00
Short shov. turn.	11.75 to 12.25
Machine shop turn.	11.25 to 11.75
Rerolling rails	21.50 to 22.00
Steel rails under 3 ft.	19.25 to 19.75
Steel rails under 2 ft.	21.00 to 21.50
Angle bars steel	20.00 to 20.50
Cast iron carwheels	18.50 to 19.00
Railroad malleable	21.25 to 21.75
Agric. malleable	14.75 to 15.25
	Per Net Ton
Iron car axles	23.50 to 24.00
Steel car axles	22.50 to 23.00
Locomotive tires	15.00 to 15.50
Pipes and flues	11.50 to 12.00
No. 1 machinery cast.	16.00 to 16.50
Clean auto. blocks	18.00 to 18.50
No. 1 railroad cast	15.00 to 15.50
No. 1 agric. cast	13.50 to 14.00
Stove plate	11.50 to 12.00
Grate bars	11.50 to 12.00
Brake shoes	11.50 to 12.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$18.50 to $19.00
No. 2 hvy. mltng. steel	17.50 to 18.00
Low phos. plate	21.00 to 21.50
No. 1 busheling	17.75 to 18.25
Hydraulic bundles	18.00 to 18.50
Machine shop turn	11.00 to 11.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$18.00 to $18.50
No. 2 hvy. mltng. steel	17.00 to 17.50
Comp. sheet steel	$17.50 to $18.00
Light bund. stampings	14.50 to 15.00
Drop forge flashings	17.00 to 17.50
Machine shop turn	10.00 to 10.50
Short shov. turn.	10.50 to 11.00
No. 1 busheling	17.25 to 17.75
Steel axle turnings	16.00 to 16.50
Low phos. billet and bloom crops	22.00 to 22.50
Cast iron borings	10.50 to 11.00
Mixed bor. & turn.	10.50 to 11.00
No. 2 busheling	10.50 to 11.00
No. 1 cupola cast	20.50 to 21.00
Railroad grate bars	14.25 to 14.75
Stove plate	14.25 to 14.75
Rails under 3 ft.	21.50 to 22.00
Rails for rolling	19.50 to 20.00
Railroad malleable	21.50 to 22.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$18.00 to $18.50
No. 2 hvy. mltng. steel	16.00 to 16.50
Scrap rails	20.00 to 20.50
New hvy. b'ndled sheets	16.00 to 16.50
Old hydraul. bundles	14.00 to 14.50
Drop forge flashings	16.00 to 16.50
No. 1 busheling	16.00 to 16.50
Machine shop turn	11.50 to 12.50
Shov. turnings	12.50 to 13.00
Mixed bor. & turn.	10.50 to 12.00
Cast iron borings	10.50 to 12.00
Knuckles & couplers	21.00 to 21.50
Coil & leaf springs	21.00 to 21.50
Rolled steel wheels	21.00 to 21.50
No. 1 machinery cast.	20.00 to 20.50
No. 1 cupola cast	18.50 to 19.00
Stove plate	14.50 to 15.00
Steel rails under 3 ft.	23.00 to 23.50
Cast iron carwheels	18.50 to 19.00
Railroad malleable	21.00 to 21.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	$15.75 to $16.25
No. 1 hvy. melting	15.25 to 15.75
No. 2 hvy. melting	15.25 to 15.75
No. 1 locomotive tires	16.25 to 16.75
Misc. stand. sec. rails	17.50 to 18.00
Railroad springs	16.25 to 16.75
Bundled sheets	10.50 to 11.00
Cast bor. & turn.	6.25 to 6.75
Machine shop turn.	7.50 to 8.00
Heavy turnings	10.50 to 11.00
Rails for rolling	19.00 to 19.50
Steel car axles	19.50 to 20.00
No. 1 RR wrought	12.00 to 12.50
No. 2 RR wrought	14.00 to 14.50
Steel rails under 3 ft.	19.00 to 19.50
Steel angle bars	18.00 to 18.50
Cast iron carwheels	16.00 to 16.50
No. 1 machinery cast.	16.75 to 17.25
Railroad malleable	17.50 to 18.00
Breakable cast	16.00 to 16.50
Stove plate	12.00 to 12.50
Grate bars	10.50 to 11.00
Brake shoes	11.75 to 12.25

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	$14.00 to $14.50
No. 2 hvy. mltng steel	12.00 to 12.50
Scrap rails for mltng.	18.50 to 19.00
Loose sheet clippings	9.00 to 9.50
Hydrau. b'ndled sheets	13.50 to 14.00
Cast iron borings	5.50 to 6.00
Machine shop turn.	6.50 to 7.00
No. 1 busheling	10.50 to 11.00
No. 2 busheling	4.75 to 5.00
Rails for rolling	20.50 to 21.00
No. 1 locomotive tires	16.00 to 16.50
Short rails	21.00 to 21.50
Cast iron carwheels	16.00 to 16.50
No. 1 machinery cast.	17.50 to 18.00
No. 1 railroad cast	16.00 to 16.50
Burnt cast	10.00 to 10.50
Stove plates	10.00 to 10.50
Agricul. malleable	14.50 to 15.00
Railroad malleable	17.50 to 18.00
Mixed hvy. cast	15.25 to 15.75

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	$15.00
No. 2 hvy. melting steel	14.00
No. 1 busheling	14.00
Scrap steel rails	15.00
Steel rails under 3 ft.	16.00
Rails for rolling	16.50
Long turnings	5.00
Cast iron borings	7.50
Stove plate	10.00
Steel axles	18.00
No. 1 RR wrought	14.00
No. 1 cast	16.00
No. 2 cast	12.50
Cast iron carwheels	13.00
Steel car wheels	16.00

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 heavy melting	$15.50 to $16.00
No. 2 heavy melting	14.50 to 15.00
Borings and turnings	10.00 to 10.50
Long turnings	10.25 to 10.75
Short shov. turnings	11.00 to 11.50
No. 1 cast	19.00 to 19.50
Automotive cast	19.00 to 19.50
Hvy. breakable cast	15.50 to 16.00
Stove plate	12.50 to 13.00
Hydraul. Comp. sheets	16.50 to 17.00
New busheling	15.50 to 16.00
Sheet clips	13.00 to 13.50
Flashings	15.00 to 15.50
Low phos. plate	17.50 to 18.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	$14.00 to $14.50
No. 2 hvy. mltng. steel	12.00 to 12.50
Hvy. breakable cast	15.50 to 16.00
No. 1 machinery cast.	17.50 to 18.00
No. 2 cast	14.00 to 14.50
Stove plate	12.00 to 12.50
Steel car axles	19.50 to 20.50
Shafting	19.50 to 20.50
No. 1 RR. wrought	14.50 to 15.50
No. 1 wrought long	13.00 to 13.50
Spec. iron & steel pipe	11.00 to 11.50
Rails for rolling	16.00 to 16.50
Clean steel turnings*	6.00 to 6.50
Cast borings*	6.00 to 6.50
No. 1 blast furnace	6.00 to 6.50
Cast borings (chem.)	10.00 to 11.00
Unprepared yard scrap	8.00 to 8.50
Light iron	6.00 to 6.50

Per gross ton delivered local foundries:

No. 1 machin. cast	$18.00 to $19.00
No. 2 cast	17.00 to 17.50

* $1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	$13.00 to $13.25
Machine shop turn.	6.90
Mixed bor. & turn.	5.15
Bun. skeleton long	10.40
Shafting	17.00 to 17.50
Stove plate	10.00 to 10.50
Cast bor. chemical	8.00 to 8.50

Per gross ton delivered consumers' yards:

Textile cast	$15.50 to $17.00
No. 1 machine cast	15.50 to 17.00

Per gross ton delivered dealers' yards:

No. 1 hvy. mltng. steel	$13.75
No. 2 steel	12.75

PACIFIC COAST

Per net ton delivered to consumer:

	San Fran.	Los Ang.	Seattle
No. 1 hvy. mltng. steel	$12.00	$12.00	$11.00
No. 2 hvy. mltng. steel	11.00	11.00	10.00
Bundles	10.00	10.00	9.00

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel	$11.50	$11.00
No. 1 hvy. mltng. steel	11.00	10.50
No. 2 hvy. mltng. steel	9.75	9.25
Mixed dealers steel	8.75	8.25
Drop forge flashings	9.75	9.25
New loose clippings	8.75	8.25
Busheling	6.00	5.50
Scrap pipe	7.75	7.25
Steel turnings	7.25	6.75
Cast borings	6.75	6.25
Machinery cast	20.00	19.00
Dealers' cast	19.00	18.00
Stove plate	14.00	13.00

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mltng. steel	$14.00 to $14.50
No. 2 hvy. mltng. steel	12.00 to 12.50
No. 2 cast	12.50 to 13.00
Stove plate	11.00 to 11.50
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel	$15.00 to $15.50
No. 2 hvy. mltng. steel	13.50 to 14.00
Rail (scrap)	15.00 to 15.50
Stove plate	$8.00 to 8.25
Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel	$17.75
No. 2 hvy. mltng. steel	16.25

Construction Steel

. . .STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings advance to 18,000 tons from 10,650 tons last week; new projects at 20,540 tons are double those in the previous week; plate awards total 4030 tons.

AWARDS

NORTH ATLANTIC STATES

1750 Tons, East Hartford, Conn., two factory additions for Pratt & Whitney Aircraft Corp., to R. C. Mahon Co., Detroit.
1200 Tons, Brooklyn, bottling plant for F. & M. Schaefer Brewing Co., to Bethlehem Steel Co., Bethlehem, Pa.
1155 Tons, North Adams, Mass., bridge, to American Bridge Co., Pittsburgh.
330 Tons, Worcester, Mass., Wyman-Gordon Co. forge shops, to Haarmann Steel Co., Holyoke, Mass.
225 Tons, Sullivan County, Pa., bridge, to Fort Pitt Bridge Works Co., Pittsburgh.
215 Tons, Storrs, Conn., girls' dormitories, to an unnamed fabricator.
150 Tons, Burlington, N. J., substation, Public Service Electric & Gas Co., to Lehigh Structural Steel Co., Allentown, Pa.
135 Tons, Camden, N. J., addition to building No. 17, Campbell Soup Co., to Lehigh Structural Steel Co., Allentown, Pa.
105 Tons, Crawford and Warren Counties, Pa., bridge, to Fort Pitt Bridge Works Co., Pittsburgh.
100 Tons, Keene, N. H., manufacturing plant, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

THE SOUTH

1500 Tons, Weirton, W. Va., two strip mill buildings for Weirton Steel Co., to Truscon Steel Co., Youngstown.
389 Tons, Little Rock, Ark., State highway bridge, to J. B. Klein Iron & Foundry Co., Oklahoma City.
285 Tons, Hillsborough County, Fla., bridge, to Bethlehem Fabricators, Inc., Bethlehem, Pa.
225 Tons, Nashville, Tenn., transmission towers for TVA, to Nashville Bridge Co., Nashville, Tenn.
210 Tons, Grady County, Ga., bridge, to Vincennes Bridge Co., Vincennes, Ind.
180 Tons, Huttonsville, W. Va., State medium security prison building, to American Bridge Co., Pittsburgh.
135 Tons, Atlanta, Ga., Seaboard Air Line freight depot, to an unnamed bidder.

CENTRAL STATES

2300 Tons, Lafayette, Ind., additions to two buildings, Aluminum Co. of America, to Bethlehem Steel Co., Bethlehem, Pa., through A. E. Kemmer, Lafayette, Ind., general contractor.
760 Tons, Kansas City, Mo., Grand Avenue viaduct, to Kansas City Structural Steel Co., Kansas City, Kan.
435 Tons, Pontiac, Mich., Yellow Coach & Truck Mfg. Co., building addition, to Whitehead & Kales Co., Detroit.
320 Tons, Moreau Junction, S. D., State bridges FAP-180-C&D, to Bethlehem Steel Co., Bethlehem, Pa.
260 Tons, Indianapolis, South Harding Street power house, to Hugh Baker & Co., Indianapolis.
230 Tons, Oglesby, Ill., bridge, to Mississippi Valley Structural Steel Co., Decatur, Ill.
215 Tons, Dearborn, Mich., bridge, to Fort Pitt Bridge Works Co., Pittsburgh.
210 Tons, Chicago, changes in Chicago Rapid Transit stations, to Hansell-Elcock Co., Chicago.
200 Tons, Bremer County, Iowa, beam spans, to Clinton Bridge Co., Clinton, Iowa.
200 Tons, Mount Vernon, Ohio, addition for Shellmar Products Co., to Mount Vernon Bridge Co., Mount Vernon, Ohio.
165 Tons, Milwaukee County, Wis., bridge, to Wisconsin Bridge & Iron Co., Milwaukee.
150 Tons, La Grange, Ill., office building addition, Electro-Motive Corp., to Joseph T. Ryerson & Son, Inc., Chicago.
150 Tons, Columbus, Ohio, bowling alley for L. L. Leveque Co., to Fort Pitt Bridge Works Co., Pittsburgh.
140 Tons, Detroit, store building for Henry Estate, to Whitehead & Kales, Detroit.
140 Tons, Norwood, Ohio, Chevrolet Motor Co. car conditioning building, to R. C. Mahon Co., Detroit.
120 Tons, Murphysboro, Ill., remodeling bridge G-84-85, for Illinois Central Railway, to American Bridge Co., Pittsburgh.
116 Tons, Newark, Ohio, office building for Ohio Power Co., to C. E. Morris, Columbus, through Robert H. Evans.
115 Tons, Rossville, Ill., bridge, to Milwaukee Bridge Co., Milwaukee.

WESTERN STATES

1630 Tons, Kettle Falls, Wash., State highway bridge, to Pacific Car & Foundry Co., Seattle.
775 Tons, Denver, National Biscuit Co. building, to American Bridge Co., Pittsburgh.
700 Tons, Newark, Cal., salt plant for Leslie Salt Co., to Herrick Iron Works, Oakland, Cal.
207 Tons, Los Angeles, bearing piles for Los Angeles River improvement, section VI, to Bethlehem Steel Co., Los Angeles, through Shannahan Brothers, Huntington Park, Cal., contractor.
130 Tons, Nome, Alaska, bridge for Alaska Railroad, to Duffin Iron Co., Chicago.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

4300 Tons, Hartford, Conn., office building, National Fire Insurance Co.
3000 Tons, Gravelly Point, Va., Washington National Airport, general contract awarded to John McShain Co., Philadelphia, by Civil Aeronautics Authority.
1800 Tons, Deer Park, N. Y., State infirmary building No. 2.
1700 Tons, New York, Cardinal Hayes Memorial College in Bronx.
650 Tons, Brockway, Pa., buildings for Brockway Glass Co.
400 Tons, Bethlehem, Pa., Eugene G. Grace Hall, Lehigh University.
380 Tons, Wellsburg, N. Y., highway bridge, project R.C. 40-36.
309 Tons, Williamsville, N. Y., railroad crossing elimination, project R. C. 40-38.
300 Tons, Buffalo, service garage addition, Brost Motors, Inc.
275 Tons, St. Lawrence County, N. Y., highway project F.A.R.C. 40-39.
260 Tons, Forest County, Pa., highway bridge.
240 Tons, Beverly, Mass., buildings for Beverly Hospital.
230 Tons, Baltimore, State National Guard hangar, Municipal Airport.
225 Tons, Cumberland, Md., store building for Montgomery Ward & Co.
200 Tons, Bennington, Vt., State bridge.
200 Tons, Orange County, N. Y., State bridge RC-40-25.
180 Tons, Cape May, N. Y., State overpass.
170 Tons, Jamison, N. Y., railroad crossing elimination, project P.S.C. 6004.
170 Tons, Lee, Mass., building for Smith Paper, Inc.
165 Tons, Hackettstown, N. J., building for Centenary Collegiate Institute.
125 Tons, Chelmsford, Mass., State bridge.
120 Tons, Baltimore, air station building, Municipal Airport.
110 Tons, Pittsburgh, building alterations for Pittsburgh Press Publishing Co.
110 Tons, Allegheny County, Pa., highway bridge.

THE SOUTH

2200 Tons, Jacksonville, Fla., Naval Air Station building.

CENTRAL STATES

2500 Tons, Dayton, Ohio, hangars for Wright Field.
250 Tons, Evanston, Ill., Northwestern University Technological Institute; bids June 11.
200 Tons, St. Louis, overpass at Gravois Avenue and Missouri Pacific Railway; low bid rejected and new bids to be asked June 7.
140 Tons, Blackhawk County, Iowa, State bridges FAP-837-A.

WESTERN STATES

2000 Tons, Seattle, Boeing Airplane Co. plant.
415 Tons, Grand Lake, Colo., tunnel supports and liners for Continental Divide Tunnel, Station 6+00 to Station 72+00; bids June 20.
210 Tons, Cody, Wyo., bridge for Bureau of Public Roads.
205 Tons, Yellowstone National Park, Wyo., bridge on East approach road; bids May 31.

FABRICATED PLATES

AWARDS

2400 Tons, Los Angeles, Glendale-Burbank distribution pipe line for Metropolitan Water District, to Southwest Welding & Mfg. Co., Alhambra, Cal., through J. F. Shea Co., Los Angeles, contractor.
420 Tons, Muskegon Heights, Mich., 30-in. intake pipe, to Chicago Bridge & Iron Co., Chicago.
350 Tons, Providence, R. I., two oil tanks for Narragansett Electric Co., to Bethlehem Steel Co., Bethlehem, Pa.
325 Tons, New York, pipe, Central Park and Fifth Avenue, to Alco Products Co., Dunkirk, N. Y.
235 Tons, Louisville, Ky., two deck barges for Nugent Sand Co., to St. Louis Shipbuilding & Steel Co., St. Louis.
175 Tons, Pickwick Dam, Tenn., two barges for TVA, to Hunter Steel Co., Pittsburgh.
125 Tons, Baytown, Tex., two tanks for Humble Oil & Refining Co., to Chicago Bridge & Iron Co., Chicago.

SHEET PILING

AWARDS

230 Tons, Los Angeles, Los Angeles River improvement, section VI, to Bethlehem Steel Co., Los Angeles, through Shannahan Brothers, Huntington Park, Cal., contractor.

PENDING PROJECTS

1268 Tons, Caddoa, Colo., Caddoa Dam.

Pipe Lines

Socony-Vacuum Oil Co., Inc., 1100 Elk Street, Buffalo, plans new 6-in. welded steel pipe line from Buffalo to Syracuse, N. Y., about 160 miles, for gasoline transmission. Booster stations will be installed along route, with bulk terminal plant at latter place. Cost over $600,000. Main offices are at 26 Broadway, New York.

C. B. Penney, Munsey Building, Baltimore, is at head of project to build new welded steel pipe from Bozoo gas field in Monroe and Summers Counties, W. Va., to Peterstown, W. Va., and vicinity, for natural gas transmission for domestic service in several communities, including new housing development at Peterstown. Booster stations, control and meter houses will be installed. Main line will be about 4-in., with small branch lines and service lines. It is proposed to organize a company to carry out development.

Cities Service Gas Co., Bartlesville, Okla., has authorized new 16-in. welded steel pipe line from point near Quapaw, Okla., to Chetopa, Kan., about 60 miles, for natural gas transmission, and will carry out work with company forces. New line will replace a present pipe line.

Metropolitan Water District, 306 West Third Street, Los Angeles, has low bid from J. F. Shea Co., Inc., 617 South Olive Street, at $800,867.80 for section of pipe line for main water supply from west end of San Rafael

tunnel No. 2, Glenoaks Boulevard, Glendale, to point near city limits on Kenneth Road, Burbank, Cal., about 6.8 miles. Bid is based on using 60 and 50-in. welded steel pipe, with gunite exterior coating and coal tar enamel lining (Schedules 29-SE and 30-SE). Company also has tendered low bid at $816,330.86 for combination of two schedules noted, as alternate proposition, using same pipe noted (Specifications 328).

City Council, Morgan City, La., is considering a proposal for furnishing municipality with natural gas tendered by Williams Brothers Corp., National Bank of Tulsa Building, Tulsa, Okla., to include pressure pipe line distributing system, with main welded steel pipe line for connection with supply source, meter house, control station and service facilities. Jesse Barber, Thibodeaux, La., is interested in project.

Southern Natural Gas Corp., Watts Building, Birmingham, has authorized new 4-in. steel pipe line from connection with present main pipe line at institution of Veterans' Administration, Birmingham Road, to Tuscaloosa, Ala., for natural gas transmission for another Government agency at latter place. Work will be carried out by company forces. Cost over $50,000.

Manufacturers Light & Heat Co., Manufacturers Gas Co., and Pennsylvania Fuel Supply Co., all with offices in Union Trust Building, Pittsburgh, and all subsidiaries of Columbia Gas & Electric Corp., 61 Broadway, New York, are dividing an order, placed by parent company, for about 10,000 tons of 16, 10 and 8-in. steel pipe among Jones & Laughlin Steel Corp., National Tube Co., and Republic Steel Corp. It will be used for new welded steel pipe line from West Virginia gas field to points in south central part of New York, for natural gas transmission, recently referred to in these columns. Cost estimated at $1,787,000, for which financing is being arranged by parent organization.

Pennsylvania Deep Drilling Corp., Bradford, Pa., plans installation of steel pipe lines in connection with development of new gas wells in Oriskany natural gas field in Corydon Township, near Warren County line. Work is scheduled to begin at once.

Cast Iron Pipe

Lynnfield, Mass., has placed 1500 tons of 4 to 12-in. pipe with United States Pipe & Foundry Co.

New Britain, Conn., has awarded 410 tons of 24-in. pipe to United States Pipe & Foundry Co.

Office of Quartermaster, Fort Slocum, N. Y., asks bids until June 14 for 10-in. submarine water line for main service (Circular 842-68).

Winchester, N. H., plans pipe lines for water system and other waterworks installation, including steel standpipe, reservoir, pumping machinery, etc. Cost about $100,000. Financing will be arranged at special municipal meeting July 8. Whitman & Howard, 89 Broad Street, Boston, are consulting engineers.

Marks, Miss., asks bids until June 4 for 6-in. pipe for water system, including fittings.

Appleton, Wis., closes bids June 1 for 2000 ft. of 6-in. and 600 ft. of 4-in.; also for 5000 to 10,000 ft. of ¾-in., 1000 ft. of 1-in., 500 ft. of 1½-in., and 500 ft. of 2-in. copper water tubing in 14 to 20-ft. lengths. Water Commission, 125 North Walnut Street, A. E. Dimick, assistant secretary, in charge.

Metropolitan Utilities District, Eighteenth and Harney Streets, Omaha, Neb., plans pipe lines for water system in District No. 886, recently created.

Hamilton, Va., plans pipe lines for water system and other waterworks installation, including new 60,000-gal. reservoir. A bond issue is being arranged for project.

Wheaton, Mo., will take bids soon for about 1900 ft. of 4-in., and 4000 ft. of 3-in. cast iron pipe, and about 8500 ft. of 2-in. galvanized pipe for water system; also for other waterworks equipment.

Alhambra, Cal., has awarded 230 tons of 6, 8, and 14-in. pipe to United States Pipe & Foundry Co., San Francisco.

Long Beach, Cal., will take bids soon on 875 tons of 6, 8, and 12-in. pipe.

Reinforcing Steel

Awards of 5800 tons; 8450 tons in new projects

AWARDS

ATLANTIC STATES

1800 Tons, Camden, N. J., building, Campbell Soup Co., to Concrete Steel Co., New York.
500 Tons, New York, East River housing project and McCullough Homes project, Baltimore, to Seaboard Steel Products Corp., New York.
400 Tons, Rochester, N. Y., building No. 18 for Eastman Kodak Co., to Bethlehem Steel Co., Bethlehem, Pa., through Ridge Construction Co., contractor.
300 Tons, Kingston, Pa., pumping station, group No. 2, for Susquehanna River flood control, to Bethlehem Steel Co., Bethlehem, Pa., through Sordoni Construction Co., contractor.
300 Tons, Paterson, N. J., Wright Aeronautical addition, to Truscon Steel Co., New York.
175 Tons, Washington, contract No. 6, East parking area, to Sweets Steel Co., Williamsport, Pa., through Jeffress-Dyer, Inc., contractors.
170 Tons, Rochester, N. Y., store for Sears Roebuck Co., to Truscon Steel Co., Youngstown, through A. Friedrich & Sons, contractors.
150 Tons, Buffalo, store for John H. Eckhardt, to Bethlehem Steel Co., Bethlehem, Pa., through Metzger Construction Co., contractor.
125 Tons, Syracuse, N. Y., Delaware, Lackawanna & Western Railroad (mesh), to Truscon Steel Co., New York, through Elmhurst Contracting Co.
114 Tons, Willington, Conn., bridge, to Truscon Steel Co., Boston; A. O. Savin Construction Co., East Hartford, Conn., contractor.
100 Tons, Kittanning, Pa., flood wall, to Carnegie-Illinois Steel Corp., Pittsburgh, through Stewart O. Strandberg, contractor.

SOUTH AND CENTRAL

220 Tons, Pulaski County, Ark., highway project, FAGM-438-B, to Jones & Laughlin Steel Corp., Pittsburgh, through Arkansas Foundry Co., Ottinger Brothers, contractors.
200 Tons, Chicago, Santa Fe viaduct, Western Avenue, to Inland Steel Co., Chicago.
150 Tons, Milwaukee County, Wis., grade crossing project, to Joseph T. Ryerson & Son, Inc., Chicago.
100 Tons, Rantoul, Ill., hangar, Chanute Field, to Laclede Steel Co., St. Louis.

WESTERN STATES

325 Tons, Fairbanks, Alaska, runway fabric, to Columbia Steel Co., San Francisco.
320 Tons, Kremmling, Colo., Green Mountain power plant (Invitation B-46196-A), to Colorado Fuel & Iron Co., Denver.
192 Tons, Bakersfield, Cal., Washington School auditorium, to Ceco Steel Products Co., Los Angeles, through Opperman Co., Bakersfield, contractor.
152 Tons, Norwalk, Cal., classroom and English buildings at Excelsior High School, to Soule Steel Co. and Ceco Steel Products Co., both Los Angeles.

PENDING REINFORCING STEEL PROJECTS

ATLANTIC STATES

1600 Tons, Gravelly Point, Va., Washington National Airport; general contract awarded to John M. McShain Co., Philadelphia, by Civil Aeronautics Authority.
850 Tons, Chicopee, Mass., flood control project.
600 Tons, Binghamton, N. Y., flood wall, section No. 1, Corning, N. Y., for U. S. Engineer.
300 Tons, Wellsburg, N. Y., highway project R.C. 40-36.
300 Tons, Wassaic, N. Y., highway project R.C. 40-37.
205 Tons, Kingston, Pa., flood control culverts, U. S. Engineer.
200 Tons, St. Lawrence County, N. Y., highway project F.A.R.C. 40-39.
200 Tons, Batavia, N. Y., highway project R.C. 40-18.
100 Tons, Leonardsville, N. Y., highway project R.C. 40-35.

CENTRAL STATES

450 Tons, St. Louis, overpass at Gravois Avenue and Missouri Pacific Railway; low bid rejected and new bids asked June 7.
420 Tons, Dayton, Ohio, McCook Field housing project.
240 Tons, Indianapolis, apartment building; E. A. Carson Co., contractor.
225 Tons, Portsmouth, Ohio, Wayne Hills housing project.
200 Tons, Ironton, Ohio, six pumping stations, U. S. Engineer.
200 Tons, Kansas City, Mo., beef house for Armour & Co.
160 Tons, Hutsonville, Ill., power house.
130 Tons, Milwaukee, box sewer.
110 Tons, Detroit, grade separation, Ford and Miller Road.
110 Tons, Chicago, Northwest stations, for Commonwealth Edison Co.
100 Tons, Topeka, Kan., Shawnee County bridge.
Unstated Tonnage, Rantoul, Ill., completion of Air Corps technical school; bids June 3.

WESTERN STATES

2125 Tons, Caddoa, Colo., Caddoa Dam.
1367 Tons, San Rafael, Cal., viaduct; bids June 12.
144 Tons, Ignacio, Colo., Pine River project (Invitation 32205-A); bids in.
142 Tons, Yellowstone National Park, Wyo., East approach road bridge; bids May 31.
109 Tons, South Pasadena, Cal., Arroyo Seco Parkway construction, between Pasadena Avenue at Avenue 35 and Avenue 26; bids June 3.

TRADE NOTES

Cutler-Hammer, Inc., Milwaukee, has moved its office and warehouse in Atlanta, Ga., to a new location at 134 Marietta St. N. W. The office is in charge of A. C. Gibson.

Cowles Detergent Co., Cleveland, through its metal cleaner department announces appointment of Mau-Sherwood Supply Co., 800 Lime Road, Cleveland, as distributers of Cowles anhydrous metal cleaners.

Sawhill Mfg. Co., formerly of Bridgeville, Pa., has moved its offices and plant to Wheatland, Pa.

Kaukauna Machine Corp., Kaukauna, Wis., has been licensed to use the Sorbo-Mat process by Sorbo-Mat Process Engineers, makers of controlled specifiction cast irons.

McCallum-Hatch Bronze Co., Inc., announces that its new offices and foundry are at 46 Letchworth Street, corner of Grant Street, Buffalo.

Ransome Concrete Machinery Co., manufacturer of concrete mixing, paving and handling machinery, Dunellen, N. J., has appointed as representatives to handle welding tables and positioners the Arcway Equipment Co., 3717 Filbert Street, Philadelphia, in Pennsylvania, Delaware, West Virginia, Maryland, Virginia and part of New Jersey, and Hobart Welder Sales and Service, 6715 Carnegie Avenue, Cleveland, in Northeastern Ohio.

Fire-Brick Engineers, Inc., 1548 West Bruce Street, Milwaukee, has been appointed sales representative for Charles Taylor Sons Co., Cincinnati, for the State of Wisconsin.

Koenitzer Engineering Corp., 2867 S. Superior Street, Milwaukee, has been organized to deal in carburetors for railroads, tractors, automobiles and similar motive equipment. Rolland D. Koenitzer, Stella M. Koenitzer and William F. Double are the principals.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes[2]	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	Worcester =		3.00¢			2.90¢		
Cooperage stock	2.20¢	2.20¢													
Commodity C-R	2.95¢			2.95¢			2.95¢	Worcester =		3.35¢			3 05¢		
TIN PLATE Standard cokes (Per 100-lb. base box)	$5.00	$5.00	$5.00						$5.10						
BLACK PLATE 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢			
TERNES, M'FG Special coated (Per base box)	$4.30		$4.30						$4.40						
BARS															
Soft steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		Duluth = 2	.25¢		2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢					2.40¢	2.70¢			
Reinforcing (billet)[7]	1.70 to 1.90¢	1.70 to 1.90¢	1.70 to 1.90¢	1.70 to 1.90¢	1.70 to 1.90¢	1.70 to 1.90¢	1.70 to 1.90¢	1.70 to 1.90¢			2.20 to 2.25¢	2.25 to 2.30¢	1.80 to 2.00¢		
Reinforcing (rail)[7]	1.70 to 1.90¢	1.70 to 1.90¢	1.70 to 1.90¢	1.70 to 1.90¢	1.70 to 1.90¢	1.70 to 1.90¢	1.70 to 1.90¢				2.20 to 2.25¢	2.25 to 2.30¢	1.80 to 2.00¢		
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢							2.70¢		
PLATES									Coatesville and Claymont =						
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.10¢		2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		Bethlehem = 2.10¢			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			Worcester =		3.00¢						
0.51 to 0.75 Carbon	4.30¢			4.30¢			Worcester =		4.50¢						
0.76 to 1.00 Carbon	6.15¢			6.15¢			Worcester =		6.35¢						
1.01 to 1.25 Carbon	8.35¢			8.35¢			Worcester =		8.55¢						
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢										
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢										
Spring	3.20¢	3.20¢		3.20¢	3.20¢										
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢					2.85¢	2.95¢			
IRON BARS															
Common		2.25¢			Terra Haute, Ind. =			2.15¢							
Refined	3.75¢														
Wrought	4.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to 29 gage within certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted to distributers. The so-called published price on new billet reinforcing bars is 2.15c. a lb. f.o.b. major basing points, and on rail reinforcing bars is 2.00c. a lb. The price range shown above, however, represents the going price at the present time. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lots to manufacturing trade.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., $3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	56
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. and 6 in. and smaller	68½
Larger and longer up to 1 in.	66
1⅛ in. and larger	64
Lag bolts	66
Plow bolts, Nos. 1, 2, 3, and 7	68½
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:	
½ in. and smaller	67
9/16 in. to 1 in. inclusive	64
1⅛ in. to 1½ in. inclusive	62
1⅝ in. and larger	60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in. and smaller	67	70
9/16 to 1 in.	64	65
1⅛ in. through 1½ in.	62	62
1⅝ in. and larger	60	60

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	72½
Stove bolts in packages, with nuts attached, add 15% extra.	
Stove bolts in bulk	83½

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(1½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.40

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10

Cap and Set Screws

	Per Cent Off List
Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled headless set screws, cut thread ¼ in. and larger	64
3/16 in. and smaller	73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	70
Upset set screws, cup and oval points	75
Milled studs	52

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	May 22	May 23	May 24	May 25	May 27	May 28
Copper, Electrolytic[1]	11.50	11.50	11.50	11.50	11.50	11.50
Copper, Lake	11.50	11.50	11.50	11.50	11.50	11.50
Tin, Straits, New York	53.75	53.50	53.00	....	52.50	53.50
Zinc East St. Louis[2]	5.75	5.75	6.00	6.00	6.00	6.00
Lead, St. Louis[3]	4.85	4.85	4.85	4.85	4.85	4.85

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

Tin	New York	Cleveland
Straits pig	54.50	56.50
Copper		
Lake	13.25	12.625
Electro	12.75	12.625
Castings	12.375	12.375
H. R. sheets*	20.12	20.12
Seamless tubes*	20.62	20.62
Brass		
Yellow, sheets*	18.31	18.31
Yellow, rods*	13.26	13.26
Seamless tubes*	21.06	21.06
Zinc		
Slabs	7.35	7.75
Sheets, No. 9 casks	12.00	12.00
Lead		
American pig	6.10	5.50
Bar	8.05	8.25
Cut sheets	8.25	8.25
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.50	21.50
No. 1 remelt., 98-99%	18.00	18.50
Solder		
½ and ½	33.00	32.50
Babbitt		
Anti-friction grade	22.15	22.00

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

Copper	Dealers' Buying Prices	Dealers' Selling Prices
Hvy. crucible	9.00	9.625
Hvy. and wire	8.00	8.375
Light and bottoms	7.125	7.625
Brass		
Heavy	4.875	5.375
Light	4.00	4.75
No. 1 yel. turn.	4.50	5.50
No. 1 red or compo. turn	7.375	7.875
Hvy. mach. compo.	7.25	8.125
Lead		
Heavy	4.00	4.375
Aluminum		
Cast	8.00	9.00
Sheet	13.00	14.00
Zinc	3.00	3.75

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 19c.-20c. a lb.; No. 12 remelt No. 2 standard, 18c.-19c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $194 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 12c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33⅓; on brass sheets and rods, 40; on brass tubes, 33⅓, and copper tubes, 40.

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade ..... 2.70c.
Delivered, Detroit ..... 2.80c.

S.A.E. Series Numbers	Alloy Differential, per 100 Lb.
2000 (1.5 Ni)	$0.35
2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.55
2500 (5 Ni)	2.25
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)	0.75
x4340 Cr-Ni-Mo	1.65
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.10
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)	2.60
6100 Cr-V bar	1.20
6100 Cr-V spring steel	0.85
Cr-Ni-V	1.50
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c., carlots.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H't strip	17.00c.	17.50c.	24.00c.	35.00c.
C'ld st.	22.00c.	22.50c.	32.00c.	52.00c.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

for **EXTREME SERVICE PARTS**

PROVIDING a stubborn resistance to breakage, deformation and wear, Ampco Metal does the job where other metals fail — in parts subject to heavy loading and requiring sustained accuracy — in difficult bearing, nut, gear, guide and insert services.

More and more machine tool builders are changing to Ampco Metal to secure the qualities they have long sought for extreme service bronze parts.

For the complete facts send for engineering data sheets and the Ampco Metal bulletin.

AMPCO METAL, INC., Dept. IR-530, Milwaukee, Wis.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
1 in. o.d.	13 B.W.G.	$9.01	$7.82	....
1¼ in. o.d.	13 B.W.G.	10.67	9.26	....
1½ in. o.d.	13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d.	13 B.W.G.	13.42	11.64	11.06
2 in. o.d.	13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d.	13 B.W.G.	16.76	14.54	13.79
2¼ in. o.d.	12 B.W.G.	18.45	16.01	15.16
2½ in. o.d.	12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d.	12 B.W.G.	21.42	18.59	17.54
3 in. o.d.	12 B.W.G.	22.48	19.50	18.35
3½ in. o.d.	11 B.W.G.	28.37	24.62	23.15
4 in. o.d.	10 B.W.G.	35.20	30.54	28.66
4½ in. o.d.	10 B.W.G.	43.04	37.35	35.22
5 in. o.d.	9 B.W.G.	54.01	46.87	44.25
6 in. o.d.	7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2.000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price=$200 Per Net Ton

Butt Weld

Steel	Black	Galv.
⅛ in.	56	36
¼ to ⅜ in.	59	43½
½ in.	63½	54
¾ in.	66½	58
1 to 3 in.	68½	60½

Wrought Iron	Black	Galv.
¼ and ⅜ in.	+9	+30
½ in.	24	6½
¾ in.	30	13
1 and 1¼ in.	34	19
1½ in.	38	21½
2 in.	37½	21

Lap Weld

Steel		
2 in.	61	52½
2½ and 3 in.	64	55½
3½ to 6 in.	66	57¼
7 and 8 in.	65	55½
9 and 10 in.	64½	55
11 and 12 in.	63½	54

Wrought Iron		
2 in.	30½	15
2½ to 3½ in.	31½	17½
4 in.	33½	21
4½ to 8 in.	32½	20
9 to 12 in.	28½	15

Butt weld, extra strong, plain ends

Steel	Black	Galv.
⅛ in.	54½	41½
¼ to ⅜ in.	56½	45½
½ in.	61½	53½
¾ in.	65½	57½
1 to 3 in.	67	60

Wrought Iron		
¼ and ⅜ in.	+10	+43
½ in.	25	9
¾ in.	31	15
1 to 2 in.	38	22½

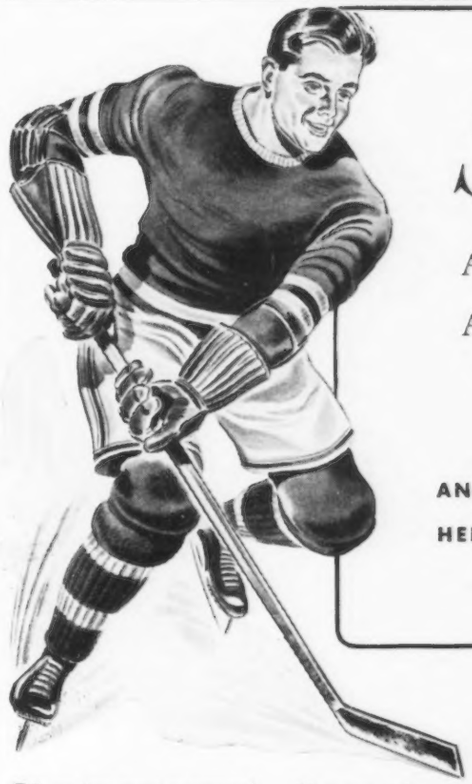
Lap weld, extra strong, plain ends

Steel		
2 in.	59	51½
2½ and 3 in.	63	55½
3½ to 6 in.	66½	59
7 and 8 in.	65½	56
9 and 10 in.	64½	55
11 and 12 in.	63½	54

Wrought Iron		
2 in.	33½	18½
2½ to 4 in.	39½	25½
4½ to 6 in.	37½	24
7 and 8 in.	38½	24½
9 to 12 in.	32	20½

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

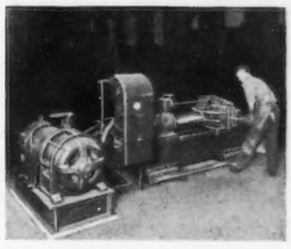


Speed—

AS MUCH OR AS LITTLE AS YOU NEED

•

AN ADVANTAGE OF A-E-CO HELE-SHAW FLUID POWER



EASE of CONTROLLING high pressures makes fluid power ideal for bulldozers. The Hele-Shaw Pump may be adjusted for a wide variation in strokes per minute.

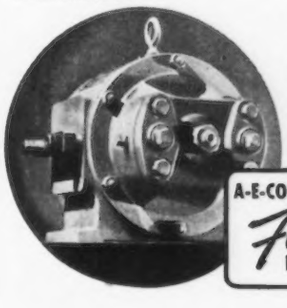
IF you've ever compared the speed of a hydraulically driven face grinder table, taking a light finishing cut, with the movement of a slowly closing, hydraulically operated press, then you will know what Hele-Shaw Fluid Power is capable of in speed variation.

With Fluid Power you can race . . . or creep so slowly that movement of the driven mechanism is unnoticeable.

You can select *any* speed within the limits of the Hele-Shaw Pump by simply pulling a lever or turning a wheel. It's that easy. Speed variation is important although it is only one of many benefits of Fluid Power operation. Here's pressure — up to 3000 pounds per square inch . . . sensitive control of movements of heavy machine parts, mechanical simplicity, dependability, ease of application, manual or automatic control over one or over many steps in a complete cycle of operation.

And you're likely to find Fluid Power saves operating and maintenance costs.

We haven't told you the whole story because that would require much more space than this page. We'll continue when we've heard your problem. Call us up or drop us a line and we'll be glad to help you to build-in or design-in Hele-Shaw Fluid Power (oil under pressure for driving machines).



A-E-CO HELE-SHAW *Fluid* POWER

AMERICAN ENGINEERING COMPANY

2410 ARAMINGO AVENUE, PHILADELPHIA, PA.

Other A-E-CO Products: Lo-Hed Hoists, Taylor Stokers, Marine Deck Auxiliaries.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, bessemer, 51.50%..	$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%....	4.60
Mesaba, non-bessemer, 51.50%	4.45
High phosphorus, 51.50%.....	4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore, Exclusive of Duty

Per Unit

Algerian, low P, Cu free, dry, 55 to 58% Fe.....	14c.
Caucasian, washed, 52% Mn...	50c.
African, Indian, 44 to 48% Mn.	46c.
African, Indian, 49 to 51% Mn.	49c.
Brazilian, 46 to 48% Mn.....	47c.
Cuban, del'd, duty free, 51% Mn	62c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	$23.00 to $23.50
Tungsten, domestic scheelite, delivered	23.00 to 23.50
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton:	
South African (low grade)..	$19.00
Rhodesian, 45%.....	22.00
Rhodesian, 48%.....	26.00 to 27.00

*All foreign ore prices are nominal. War conditions have prevented trading in Swedish and Turkish ores and all quotations have therefore been withdrawn.

Andrews Quality

PROVED AT ALL THREE CRITICAL POINTS

IN THE STEEL PLANT

IN YOUR PRODUCTION

IN PRODUCT PERFORMANCE

ANDREWS STEEL

It is not enough to prove the quality of the bar, billet or slab at the Andrews plant in the laboratory. That is but the initial test. The second is equally important—how Andrews steel acts under your production processes and methods, and how well it fits into the requirements of your product. The third, performance, is the vital trial ground. This is the most critical and exacting of all, where your product must demonstrate its ability to give trouble-free, dependable, day-in and day-out service.

Andrews steel is manufactured with this third great test in mind. That is why so many Andrews customers find it to their advantage to standardize on Andrews steel—and enjoy the benefits of triple-proved quality at all three critical points—in the steel plant—in your production—in the hands of the consumer.

THE ANDREWS STEEL CO.
NEWPORT, KENTUCKY

DIVISIONS
THE NEWPORT ROLLING MILL COMPANY
THE GLOBE IRON ROOFING & CORRUGATING CO.

ANDREWS PRODUCTS IN CARBON AND ALLOY STEEL: Bars • Plates • Universal Mill Plates • Sheet Bars • Billets • Blooms • Slabs

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.....	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton	$40.00
Light rails (from rail steel), gross ton	39.00

Base per Lb.

Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast.....	2.30c.
Track bolts, steam railroads...	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts)...	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail.....	$20.00
Domestic, f.o.b. Ohio River landing barges	20.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines..	$20.50 to 22.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid....	$25.00 to $25.50
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines....	$31.00
As above, in bags, f.o.b. same mines	$32.60

REFRACTORIES

Fire Clay Brick

Per 1000 f.o.b. Works

Super-duty brick, at St. Louis..	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey.....	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois.....	42.75
Second quality, New Jersey....	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton.....	7.10

Silica Brick

Pennsylvania	$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement, net ton (Eastern)	8.55

Chrome Brick

Net per Ton

Standard f.o.b. Baltimore, Plymouth Meeting and Chester...	$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	50.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester	$72.00
Chemically bonded, f.o.b. Baltimore	61.00

Grain Magnesite

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks).....	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

*None available.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....$100.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$32.00
Domestic, 26 to 28%..... 39.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size

50% (carload lots, bulk).....$69.50*
50% (ton lots, packed)..... 82.00*
75% (carload lots, bulk).....126.00*
75% (ton lots, packed) 142.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....$33.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio

5.00 to 5.50%.....$27.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots. Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon .....17.50c.
1% carbon .....18.50c.
0.10% carbon .....20.50c.
0.06% carbon .....21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon $98.00*
2.50% carbon 103.00*
2% carbon 108.00*
1% carbon 118.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V., del'd $2.70 to $2.90†
Ferracolumbium, per lb. contained columbium, f. o. b. Niagara Falls, N. Y., ton lots ..... $2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton $58.50
Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville $75.00
Ferromolybdenum, per lb. Mo, f.o.b. furnace..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace ..... 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

•Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

FUEL OIL

Per Gal.

No. 3, f.o.b. Bayonne, N. J.....4.75c.
No. 6, f.o.b. Bayonne, N. J.....3.21c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland.5.25c.
No. 4 industrial, del'd Cleveland.5.00c.
No. 5 industrial, del'd Cleveland.3.75c.
No. 6 industrial, del'd Cleveland.3.25c.

FOR SHOCK LOADS
AT HIGH SPEEDS—
STEEL PICKS PENOLA!
● Steel men don't take chances on lubricants. They can't! Especially since the trend is toward faster rolling speeds and fewer passes by taking heavier drafts. That means greater bearing stresses and heavier roll neck pressures.
For complete protection under these conditions, a vast majority of steel mill operators in the U. S. and Canada specify Penola lubricants for all roller bearings, gear drives and pinions!
Penola manufactures and sells more steel mill lubricants than any other maker in the world. Let Penola's lubrication engineers help you. They're at your service!
PENOLA LUBRICANTS
Penola Inc., Pittsburgh, Pa.
(Formerly Pennsylvania Lubricating Company)
New York • Chicago • Detroit • St. Louis
LUBRICANTS FOR THE STEEL INDUSTRY SINCE 1885

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt .....$4.00 to $4.25
Foundry, f.o.b. Connellsville, prompt .....$5.25 to 5.50
F'dry, by-product, Chicago.... 10.50
F'dry, by-product, New England 12.50
Foundry, by-product, Newark or Jersey City .....$11.30 to $11.90
F'dry, by-product, Philadelphia 11.13
F'dry, by-product, Cleveland... 11.05
F'dry, by-product, Cincinnati.. 10.50
Foundry, Birmingham 7.50
F'dry, by-product, St. Louis $10.75 to $11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports.....$14.75

BRITISH AND CONTINENTAL

British

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export. £17 18s.
Tin plate, per base box 32s. to 33s.
Steel bars, open hearth 13£ 9s.
Beams, open hearth.... 12£ 2s. 6d.
Channels, open hearth.. 12£ 2s. 6d.
Angles, open hearth.... 12£ 2s. 6d.
Black sheets, No. 24 gage 17£ max.*; 17£ min.**
Galvanized sheets, No. 24 gage 19£ 10s. max.*; 19£ 10s. min.**

*Empire markets only.
**Other than Empire markets.

Continental

Per Gross Ton, Belgian Francs, f.o.b. Continental Ports

Bars, merchant 1500
Plates 1750
Joists 1475
Sheets, thin 1900

Above prices are minimum base to which 100 francs should be added to cover war risk insurance, freight charges, etc.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	***$24.50***	***$24.00***	***$25.50***	***$25.00***	.....
Brooklyn	***26.50***	.....	.....	***27.00***	.....
Jersey City	***25.53***	***25.03***	***26.53***	***26.03***	.....
Philadelphia	***24.84***	***24.34***	***25.84***	***25.34***	.....
Bethlehem, Pa.	$24.00	$23.50	$25.00	$24.50	.....
Everett, Mass.	24.00	23.50	25.00	24.50	.....
Swedeland, Pa.	24.00	23.50	25.00	24.50	.....
Steelton, Pa.	.....	23.50	.....	.....	28.50
Birdsboro, Pa.	24.00	23.50	25.00	24.50	28.50
Sparrows Point, Md.	24.00	23.50	.....	.....	.....
Erie, Pa.	23.00	22.50	24.00	23.50	.....
Neville Island, Pa.	23.00	22.50	23.50	23.00	.....
Sharpsville, Pa.	23.00	22.50	23.50	23.00	.....
Buffalo	23.00	22.00	24.00	23.50	28.50
Cincinnati	***23.44***	***23.61***	.....	***24.11***	.....
Canton, Ohio	***24.39***	***23.89***	***24.89***	***24.39***	.....
Mansfield, Ohio	***24.94***	***24.44***	***25.44***	***24.94***	.....
St. Louis	***23.50***	***23.02***	.....	.....	.....
Chicago	23.00	22.50	23.50	23.00	.....
Granite City, Ill.	23.00	22.50	23.50	23.00	.....
Cleveland	23.00	22.50	23.50	23.00	.....
Hamilton, Ohio	23.00	22.50	.....	23.00	.....
Toledo	23.00	22.50	23.50	23.00	.....
Youngstown	23.00	22.50	23.50	23.00	.....
Detroit	23.00	22.50	23.50	23.00	.....
St. Paul	***25.63***	.....	***26.13***	***25.63***	.....
Duluth	23.50	.....	24.00	23.50	.....
Birmingham	19.38*	18.00	24.00	.....	.....
Los Angeles, San Francisco and Seattle	***26.50***	.....	.....	.....	.....
Provo, Utah	21.00	.....	.....	.....	.....
Montreal†	27.50	27.50	.....	28.00	.....
Toronto†	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....$22.50

CHARCOAL

Lake Superior fce.....$27.00
Delivered Chicago 30.34

*Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

WAREHOUSE PRICES

(Base Prices, Dollars per 100 lb., Delivered Metropolitan Areas)

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.15	$3.05	$3.15	$3.35	$3.38	$3.23	$3.05	$3.51	$3.45	$3.18	$3.60	$3.48	$4.10
Sheets, cold rolled	....	4.10	4.05	4.35	4.40	4.30	4.30	4.58	....	4.12	4.95	4.43	6.30
Sheets, galvanized	4.75	4.60	4.72	4.75	4.30	4.84	4.45	4.66	4.75	4.95	5.00	4.98	5.25
Strip, hot rolled	3.40	3.40	3.30	3.75	3.76	3.48	3.62	3.86	3.70	3.52	....	3.73	....
Strip, cold rolled	3.00	3.30	3.20	3.31	3.31	3.20	3.22	3.26	....	3.41	3.83	3.54	....
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.35	3.47	3.80	3.68	4.00
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.47	3.80	3.68	4.00
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.62	3.75	3.63	4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.20	7.10	7.30	7.31	7.35	7.42	7.10	7.50	....	7.47	7.45	7.33	9.40
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.15	8.15	8.15	8.56	8.59	8.45	8.15	8.63	....	8.52	8.84	8.38	10.65
Bars, cd. drn. SAE 3100	6.75	6.75	6.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	9.80

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, less than 1500 lb., cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 150 to 499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations.

Everything Points to Greater Comfort and Safety ...in this New

SUPER DURALITE-50 GOGGLE

6 CURVE SUPER ARMORPLATE LENSES
LIGHTWEIGHT EYECUPS ...BETTER VENTILATION
NON-RUBBER HEADBAND ... PERMANENTLY ADJUSTABLE

This completely new goggle marks new high levels in comfort, protection, appearance and value.

Super Duralite-50 is a lightweight goggle built to take punishment. The close-fitting eyecups permit wide angle of vision . . . the deep-curved Super Armorplate Lenses have *greater impact-strength* than flat safety lenses. Eyecups are not affected by water, oil, perspiration or sterilizing solutions. And the metal side-screens increase effective ventilation. New non-rubber headband is quickly, *permanently* adjustable to any headsize. Insulated nose-bridge is also adjustable.

Call in your American Optical Industrial Representative . . . and have him show you today's leading value in eyecup safety goggles. Or send for detailed fact-sheet on the new American Super Duralite-50.

BUY AMERICAN...

By American Optical Company

Factories at Southbridge, Massachusetts

MANUFACTURERS, FOR MORE THAN 100 YEARS, OF PRODUCTS TO AID AND PROTECT VISION

6704

Sales Possibilities

. . . CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic

● **General Electric Co.,** Schenectady, N. Y., will take bids soon on general contract for one-story factory branch, service and distributing plant at Pittsburgh. Cost over $65,000 with equipment.

American Cyanamid Co., 30 Rockefeller Plaza, New York, industrial chemicals, etc., is concluding arrangements for purchase of about 275 acres at Wallingford, Conn., for new plant for production of resin products for plastics manufacture. It will include power house, machine shop and other mechanical departments. Cost over $500,000 with equipment.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until June 7 for 900,000 ft. of wire (Circular 454), about 39,500 ft. of cable and reels (Circular 446), about 254,000 ft. of telephone cable (Circular 444), connector units, line interval signals, time interval apparatus, etc. (Circular 448); until June 10, binding post assemblies, lamp mountings, circular levels, etc. (Circular 455).

Tubize Chatillon Corp., 2 Park Avenue, New York, rayon products, has asked bids on general contract for one-story addition to mill at Hopewell, Va. Cost over $85,000 with equipment. Carneal, Johnston & Wright, Atlantic Life Building, Richmond, Va., are architects.

Central Hudson Gas & Electric Corp., Poughkeepsie, N. Y., has arranged bond issue of $500,000, entire proceeds to be used for expansion and improvements in plants and system, including power stations, power substations, transmission and distributing lines, and other facilities. Company operates electric, gas and steam properties in parts of Dutchess, Orange, Albany, Sullivan, Ulster and neighboring counties, and has authorized appropriation of $5,282,000 for expansion and improvements in plants and systems.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 4 for six arc-welding machines (Schedule 1760) for Brooklyn Navy Yard; six diesel generators and spare parts (Schedule 1769), 1000 to 2500 electrical engine gage units, with vented fuel pressure gage (Schedule 1767) for Philadelphia yard; until June 7, one motor-driven engine lathe and spare parts (Schedule 1792) for Camden, N. J.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until June 4 for nickel-steel forgings (Circular 676), eight portable electric grinding machines (Circular 684), screw drivers and punches (Circular 665), hook forgings and rail forgings (Circular 683), 250 steel crank bodies (Circular 682), 1843 steel spanner wrenches and 1843 steel firing pin vent-cleaning tools (Circular 664); until June 6, tube steel industrial doors (Circular 680); until June 5, circular, pot-type, gas-fired hardening furnace (Circular 672).

Quartermaster Supply Officer, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until June 4 for one industrial warehouse-type gasoline tractor, and six warehouse-type trailers (Circular 626-381).

Bendix Aviation Corp., Bendix, N. J., aircraft instruments and parts, has leased large part of plant of A. P. Smith Mfg. Corp., 545 North Arlington Avenue, East Orange, N. J., and will remodel for new branch works, transferring part of plant from Bendix and increasing capacity. Main offices are at South Bend, Ind.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until June 3 for drills and reamers (Circular 1537), motor-driven marking machine and two sets of marking dies (Circular 1551), three machines for roll crimping fuse components and three single-spindle assembling machines (Circular 1546).

Catalytic Development Co., an interest of Sun Oil Co., 1608 Walnut Street, Philadelphia, has asked bids on general contract for addition to plant at Marcus Hook, Pa. Cost over $60,000 with equipment.

SKF Industries, Inc., Front Street and Erie Avenue, Philadelphia, ball and roller bearings, has let general contract to Turner Construction Co., 420 Lexington Avenue, New York, for one-story addition. Cost over $400,000 with equipment.

Supply Officer, Naval Aircraft Factory, Navy Yard, Philadelphia, asks bids until June 3 for one motor-driven cold header (Aero Req. 855), 38,000 corrosion-resisting steel wire cable thimbles and 17,000 cable steel shackles, medium carbon nickel, heat-treated, cadmium-coated (Aero Req. 1068), rotary single-stage, positive displacement, air-cooled vacuum pump and receiver tank (Aero Req. 114).

Washington District

● **Engineer Board,** Fort Belvoir, Va., asks bids until June 4 for one or two 14-in. toolroom lathes (Circular 55); until June 8, motor-driven, self-contained, quick change gear, 72-in., vertical boring mill, with accessories (Circular 43).

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until June 6 for brake press, motor-driven wood-working saw, crucible furnace, power slip roll forming machine, motor-driven shears (Circular 398-223).

Painter Motor & Machinery Co., Tazewell, Va., machinery and parts, plans new one-story plant, 75 x 100 ft. Cost about $40,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until June 4 for 12 hand warehouse barrel trucks, six two-wheel hand barrel trucks, foundry nails, extension ladders and other equipment (Schedule 4062); until June 6, brass or bronze flanged unions, flanges, tees, etc. (Schedule 4076); until June 7, diesel crawler shovel (Schedule 4074).

Crown Cork & Seal Co., Inc., Eastern Avenue and Cresson Street, Baltimore, bottle-capping machines and parts, etc., has let general contraact to Cummins Construction Corp., 803 Cathedral Street, for one-story addition to building No. 52, for storage and distribution. Cost over $45,000 with equipment. Lucius R. White, Jr., 10 West Chase Street, is architect.

Contracting Officer, Office of Chief of Engineers, Munitions Building, Washington, asks bids until June 6 for eight pneumatic hammer and nail driver combination machines, three paint-spraying units (Circular 185) for Columbus, Ohio.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 4 for motor-driven hob, reamer and cutter sharpener (Schedule 1755), electric industrial truck, lifting capacity 3000 lb. (Schedule 1759) for Washington yard; countersinks and reamers (Schedule 1690), engineers' wrenches (Schedule 1717) for Eastern and Western yards; until June 7, six rough-machined steel propeller shafts (Schedule 1788) for Portsmouth, N. H., yard.

New England

● **Worcester Wire Works, Inc.,** 70 James Street, Worcester, Mass., has let general contract to Fiske-Carter Construction Co., 8 Norwich Street, for one-story addition, 130 x 225 ft., and improvements in present plant. Cost over $70,000 with equipment. F. H. Cutting, 29 Pearl Street, is architect.

Commanding Officer, Ordnance Department, Watertown Arsenal, Watertown, Mass., asks bids until June 3 for bearings (Circular 537), face milling cutters, end mills, arbors, lathe mandrels, twist drills, hand taps and other cutting tools (Circular 539); until June 5, 500 high-speed steel end mills (Circular 403).

Jones & Lamson Machine Co., Springfield, Vt., has let general contract to Morton C. Tuttle Co., Park Square Building, Boston, for one-story addition. Cost about $45,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 4 for two windlass assemblies, with motors, controllers and spare parts (Schedule 1780) for Boston Navy Yard.

Bullard Co., Eighth Street, Bridgeport, Conn., machine tools and parts, has begun superstructure for two-story addition, 94 x 360 ft., with basement and sub-basement, for foundry.

Navy Department, Washington, is having plans prepared for alterations and plant extensions at Navy Yard, Kittery, Me., including machine shop, foundry and other departments.

South Atlantic

● **Florida Pulp & Paper Corp.,** Pensacola, Fla., James H. Allen, president, organized several months ago, is completing plans for new pulp and paper mill in Escambia County, near Pensacola, consisting of one and multi-story units for pulp and paper-making divisions for production of white wrapping papers, writing papers, tissue and other stocks, with power house, pumping station, machine shop and other mechanical departments. Cost over $1,500,000 with machinery. Company is arranging with RFC for loan of $1,760,000 for project, including development of timber properties for pulp wood supply. It is proposed to begin erection in 30 to 60 days. Hardy S. Ferguson & Co., 200 Fifth Avenue, New York, are consulting engineers.

Officer in Charge of Construction, Naval Air Station, Jacksonville, Fla., asks bids until June 11 for water system at local air station, including pumping machinery and auxiliary equipment, 200,000-gal. elevated steel tank and tower, water-treatment plant, wet salt storage plant and other structures; also for sewerage pumping station, septic tanks and other equipment for sewer system (Specifications 9788).

Buffalo District

● **Genesee Aviation Corp.,** Dansville-Mount Morris Highway, Dansville, N. Y., plans new one-story plant near municipal airport, consisting of a one-story unit, 60 x 250 ft., and auxiliary structures, for parts production and assembling. Cost over $60,000 with equipment. C. W. Knappenberg is head.

Board of Education, School District No. 1, Norwich, N. Y., plans manual training department in new two-story high school. Cost about $250,000. Bond issue in that amount is being arranged. Conrad & Cummings, 99 Collier Street, Binghamton, N. Y., are architects.

World's most modern stainless mill uses BAKER TRUCKS

{Top} Baker Ram Trucks handling coils of stainless steel in the mill's new finishing plant.

• • •

{Left} Baker Ram Truck carrying a paper-wrapped coil of stainless steel. Capacity of these trucks is 7000 lbs.

Modern Trucks Designed for Modern Handling Requirements

• The world's largest producers of stainless steel would naturally insist on the best of material handling equipment for their most modern mill. Their selection of Baker Trucks was dictated by experience with more than fifty Baker units already in service in their other plants. Determining factors were greater dependability, greater maneuverability, faster service and less time out for repairs.

If you have a material handling problem, why not let the experience of this great steel company also guide you to the right answer? Call your nearest Baker representative or write us direct.

BAKER INDUSTRIAL TRUCK DIVISION *of the Baker-Raulang Company*

2175 WEST 25th STREET • • • CLEVELAND, OHIO

In Canada: Railway and Power Engineering Corporation, Ltd.

Trade mark Registered U. S. Pat. Off.

Baker INDUSTRIAL TRUCKS

Western Pa. District

● **Aero Supply Mfg. Co.**, Corry, Pa., aircraft screw products, plans two-story and basement addition. Cost close to $50,000 with equipment. Fred A. Fuller, Commerce Building, Erie, Pa., is architect.

Fairmont Coca-Cola Bottling Works, Inc., May Street and Morgantown Avenue, Fairmont, W. Va., has approved plans for two-story mechanical-bottling, storage and distributing plant, 60 x 100 ft., with one-story service, repair and garage adjoining. Cost over $80,000 with equipment.

Ohio and Indiana

● **Strietmann Biscuit Co.**, Twelfth Street and Central Parkway, Cincinnati, will ask bids soon on general contract for new one and two-story baking plant in Westover district, Mariemont. Cost over $1,000,000 with traveling ovens, mixers and other equipment. John H. Deekin, Times Square Building, is architect; A. M. Kinney, Inc., Carew Tower Building, is consulting engineer.

Steel Improvement & Forge Co., 960 Addison Road, Cleveland, drop forgings and kindred products, has let general contract to J. L. Hunting Co., Ninth and Chester Building, for one-story addition, 25 x 140 ft. Cost close to $45,000 with equipment.

National Acme Co., East 131st Street and Coit Road, Cleveland, plans expansion in aeronautical division, used for production of wheels and brakes for airplane landing gear, etc., and will double present output.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until June 3 for one electric muffle-type furnace, two electric drying ovens and one electric vacuum oven (Circular 5713), piston forgings (Circular 1577), power unit, with sump tank, regulator valve, check valve and drain trap (Circular 1574); until June 4, 47 drill presses and 12 radial drills, all motor-driven (Circular 1575), 10 fuel pumps (Circular 1581), aluminum braided flexible armored conduit, ½-in. outside diameter (Circular 1582).

Board of Public Works, Decatur, Ind., asks bids until June 6 for remodeling municipal power plant, including installation of certain equipment for steam and electric divisions, coal-handling apparatus, switchgear, transformers and accessories, etc. Cost about $125,000 out of total expenditure of about $500,000 for project. Bids will be asked later for other work. Froehlich & Emery Engineering Co., Second National Bank Building, Toledo, Ohio, is consulting engineer.

Haynes Stellite Co., Kokomo, Ind., metal alloys, special tools, etc., has asked bids on general contract for one-story addition, 75 x 132 ft. Cost over $50,000 with equipment. Oscar Cook, Lincoln Building, Kokomo, is architect; Charles R. Ammerman, Century Building, Indianapolis, is consulting engineer.

Michigan District

● **Gairing Tool Co.**, 1629 West Lafayette Street, Detroit, boring tools, reamers, cutters, etc., will ask bids soon on general contract for new one-story plant on Hoover Road, Macomb County, near Detroit, where large tract has been secured. Cost close to $225,000 with equipment. Rupert H. Neubrecht, 233 John R. Street, is architect.

Brunswick-Balke-Collender Co., Muskegon, Mich., bowling alleys, billiard tables, metal goods, etc., has let general contract to Muskegon Construction Co., Muskegon, for one-story addition for storage and distribution. Cost about $40,000 with equipment. This is part of expansion and improvement program, entire project to cost close to $250,000 with machinery. Main offices are at Chicago.

Essex Refining Co., Essexville, Mich., care of E. E. Brehm, Mount Pleasant, Mich., head, recently organized, plans new oil refinery fronting on Saginaw River, near Essexville, consisting of several units for gasoline production, steel tank storage facilities, pumping station and other structures. Cost close to $100,000 with machinery.

South Central

● **Continental Oil Co.**, Ponca City, Okla., will begin work soon on new gasoline refinery in Westlake district, Lake Charles, La., comprising several production units for high-test gasoline output, with steel tank storage department, power house, pumping station and other mechanical divisions. Cost about $3,000,000 with machinery. Executive offices are at 10 Rockefeller Plaza, New York.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until June 3 for five horizontal, heavy-duty centrifugal pumps and accessories for phosphate pulp for Department of Chemical Engineering, capacities ranging from 1250 to 2400 gal. per min., motor-driven, with motors varying from 125 to 250 hp. Alternate bids will be received on variable speed motors; bids asked also for trashracks for penstock intakes for units Nos. 3 and 4, Wheeler dam hydroelectric power plant.

Southwest

● **Armour & Co.**, Union Stock Yards, Chicago, have asked bids on general contract for expansion and improvements in meat-packing plant at 18 Central Avenue, Kansas City, Kan., including one and multi-story addition. Cost close to $200,000 with equipment.

Monocoupe Corp., Lambert-St. Louis municipal airport, St. Louis, airplanes and parts, has arranged with Orlando Aviation Industries, Inc., Orlando, Fla., for erection of one-story plant, 150 x 150 ft., under long-term lease, for parts production and assembling. First noted company will remove to new location and increase capacity. Cost over $100,000 with equipment. Award for building has been let to Kiehl & Stevens Co., Orlando.

Reed Roller Bit Co., Mack Street, Houston, Tex., oil well drilling tools, etc., has let general contract to Sam D. Cook, 6418 Esperson Street, for two-story addition, 92 x 125 ft. Cost close to $50,000 with equipment.

Commanding Officer, Ordnance Department, San Antonio Arsenal, San Antonio, Tex., asks bids until June 6 for 12, 188 steel castings (Circular 46).

Hamman Exploration Co., Gulf Building, Houston, Tex., plans new natural gasoline and gas recycling plant in Hamman oil field, Matagorda County, Tex., with compressor station, steel tank storage division, pumping plant and other structures. Cost about $250,000 with machinery.

Middle West

● **United States Gypsum Co.**, 300 West Adams Street, Chicago, building products, will take bids soon on revised plans for one-story addition, 50 x 200 ft., to branch plant at East Chicago, Ind. Cost close to $50,000 with equipment.

G-M Laboratories, Inc., 1731 West Belmont Avenue, Chicago, precision instruments and parts, electrical equipment, etc., has let general contract to Freevol Smedberg, 5950 West Erie Street, for one-story addition to plant at 4314-28 North Knox Avenue, 118 x 141 ft. Cost over $60,000 with equipment. Battey & Childs, 231 South LaSalle Street, are architects.

Burlington Farm Machinery Corp., Burlington, Iowa, has let general contract to Carl A. Nelson, Burlington, for one-story plant for storage and distribution. Cost close to $40,000 with equipment.

John Deere Tractor Co., Waterloo, Iowa, farm tractors and parts, plans seven-story and basement addition 120 x 220 ft., for storage, distribution and other service. Cost over $200,000 with equipment.

Signal Corps Procurement District, 1819 West Pershing Road, Chicago, asks bids until June 3 for feed levers, machine screws, etc. (Circular 312); until June 5, maintenance tools, sectional framework for mounting equipment shelves, battery charger, test set, connector shelf, etc. (Circular 306); until June 12 junction boxes, main distributing frame cabinets, switchboards (Circular 296).

City Council, Thief River Falls, Minn., asks bids until June 3 for diesel engine-generating unit, capacity from 1600 to 20-50-hp., and auxiliary equipment for municipal power plant. Ralph D. Thomas & Associates, 1200 South Second Avenue, Minneapolis, is consulting engineer.

Pacific Coast

● **Commanding Officer**, Ordnance Department, Benicia Arsenal, Benicia, Cal., asks bids until June 5 for one 24 x 120-in. precision engine lathe, heavy-duty (Circular 65).

Boeing Aircraft Corp., West Michigan Street, Seattle, airplanes and parts, has let general contract to Austin Co., Seattle, for several one-story additions, totaling about 577,000 sq. ft. of floor space, for expansion in parts production and assembling divisions. Cost close to $2,000,000 with machinery.

Swift & Co., Union Stock Yards, Chicago, are asking bids on general contract until June 3 for branch plant on Fourth Street South, Seattle, one-story, 150 x 340 ft. Cost close to $200,000 with equipment.

Bureau of Reclamation, Denver, asks bids until June 5 for steel floor plates, gratings, etc., for gate-hoist structures at Grand Coulee dam, Columbia Basin project, Grand Coulee, Wash. (Specifications 1368-D).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 4 for 25 electric arc-welding sets (Schedule 1696); until June 7, motor-driven punch and shear (Schedule 1728), two 50-ton diesel-electric locomotives and spare parts (Schedule 1727) for Mare Island Navy Yard; six motor-driven sensitive drilling machines (Schedule 1724) for Puget Sound yard; one motor-driven grinder (Schedule 1744) for San Diego, Cal., Naval Air Station.

Canada

● **Wayne Pump Co.**, Canal Street, Fort Wayne, Ind., gasoline pumping equipment and parts, plans one-story Canadian branch plant at Calgary, Alta. Cost close to $60,000 with equipment.

Dominion Coal Co., Ltd., Glace Bay, Nova Scotia, plans early rebuilding of general machine shop recently destroyed by fire. Loss about $200,000 with equipment.

Abitibi Power & Paper Co., Ltd., 408 University Avenue, Toronto, Ont., plans early call for bids for new marine railway at properties at Lake Nipigon, Orient Bay, Ont. Cost close to $45,000.

Cub Aircraft, Ltd., Adam Street, Hamilton Ont., airplanes and parts, has asked bids on general contract for one-story addition, 100 x 125 ft. Cost close to $65,000 with equipment. Prack & Prack, 36 James Street South, are architects.

Provincial Papers Limited, Port Arthur, Ont., A. G. Pounsford general manager, will build plant addition to cost $150,000 with equipment.

Atlas Engineering & Machine Co., Ltd., 28 Eastern Avenue, Toronto, has plans by W. L. Somerville, 30 Bloor Street West, for plant 50 x 150 ft. for which tenders will be called soon. Cost about $50,000.

Sydney Roofing & Paper Co., Ltd., Victoria, B. C., will start work soon on plant addition on Industrial Reserve, to cost $150,000. Equipment will be installed to double present capacity.

Robert Mitchell Co., Ltd., 750 Belair Avenue, Montreal, has awarded number of subtrades for plant addition for production of munitions in connection with $300,000 expansion program. Anglin-Norcross Corp., Ltd., 892 Sherbrooke Street West, Montreal, is general contractor.